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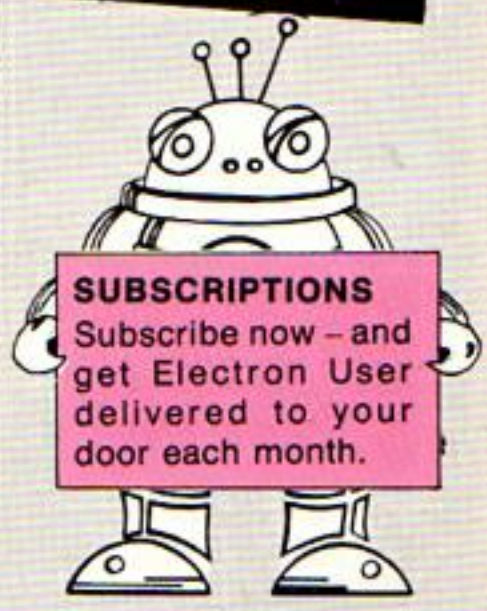

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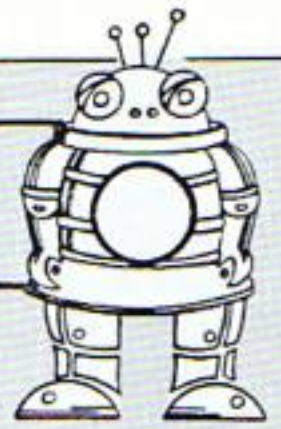


It's YOUR magazine!

IT happened again the other day. A father, in the office for another reason, came out with the fact that his son had "written a program".

The son, who was with him, blushed and tried to shut his dad up. Undeterred, the proud parent carried on describing his offspring's program.

It sounded interesting, so I asked them to send it in, which they duly did.

And it was smashing, a really nice piece of work. I enjoyed running it and also enjoyed figuring out how it was done.

I'm going to use it in the magazine and encourage him to send in any more he may have written.

Yet if his dad, no mean programmer himself, hadn't said anything, I would never have seen it.

Instead of being shared with all the readers of *Electron User*, probably only a few of his friends would have seen it.

Art experts say that there are still lots of lost masterpieces gathering dust in attics and cellars, their owners having no idea of their worth.

I wonder how many cassette tapes are similarly gathering dust. The program, once lovingly slaved over, lies forgotten.

Why are programmers so modest? The hours they spend bent over the micro typing away must be of value to them.

Why don't they share it with other micro users? If it was of some interest to you, it will probably interest others.

So if you've got a masterpiece or, at least, a program that you've thought was useful enough to spend your time writing, then let's have a look at it.

It could end up as a feature in *Electron User*. You'll be sharing the products of your creativity with many thousands of other Electron users.

And don't underestimate yourself. Perfection isn't required, though it is welcome. If you don't believe me take a look at the programs of my own that I've published!

What is required is enthusiasm, energy, and a sense of humour.

People who talk to me about *Electron User* keep saying "your magazine". They've got it wrong.

It isn't my magazine, it's YOUR magazine – the magazine written for Electron users by Electron users.

But I can't use your work if it's hidden in the attic.

Pete Bibby

electron user NEWS

Pirates to take pounding

THE END of software piracy may be in sight with the launch of a new system of program protection from A&F Software of Rochdale.

The techniques are based on a system developed by Jim Lamont, who recently had one of his program protection devices put on the secret list by the Ministry of Defence.

The aim is to make it virtually impossible for schoolchildren and computer clubs to make audio copies of software.

A&F, which markets the successful Cylon Attack for the Electron, is confident that the method will deter all but the most skillful from attempting to copy its cassette tapes.

Electron to speed up NHS communications

THE Electron has been chosen to help streamline a vital area in the work of the National Health Service.

It has been incorporated as the nerve centre of an electronic mail device to speed up medical lines of communication.

This is the first major commercial venture to feature the Electron.

Using conventional telephone lines it can automatically send and receive pages of vital data on patients when linked to others in a network.

It will eliminate potentially dangerous delays which are known to exist within the NHS.

For messages despatched by even the internal mail services of some large hospitals can take up to four days.

"We identified a real need within the National Health Service to improve their communications", a British Telecom Merlin spokesman told *Electron User.*

"This need exists not only within hospitals but also between a hospital and medical people who work in the region it serves.

"Changes in medical procedures mean that patients today are being sent home much sooner after operations.

"So the back-up medical workers must receive up-to-date information on patients' needs regarding medication and other necessary support by the time they get home.

"Here then is the answer".

All that is needed to bring the equipment immediately into service is to plug it into any available telephone jack point.

The reason for using the Electron?

"It's simply because it's the best on the market for what we wanted, in that it has a large expansion bus", said a BT spokesman.

A complete network is already destined for the Hammersmith and Fulham district health authority. Installation is scheduled to start at its operational base, Charing Cross Hospital.

After this the network will be extended to take in doctors and key health workers throughout Hammersmith and Fulham.

"We conducted most of our research into the project in this area, so we are particularly pleased that they will be the first to take advantage of it", said the BT spokesman.

"Here we have something that could be vital to any large organisation in which a lot of people need to be able to contact one another.

"As such the potential market is enormous".

Why add-ons were scarce

THE world shortage of silicon chips has been one of the principle reasons for the long delays in Electron peripherals reaching the market.

Chips that used to be delivered within a fortnight of being ordered now have a waiting time of six months or even a year.

Because of this, and the scarcity of components it has brought about, manufacturers of Electron add-ons are having difficulty in achieving anything like full production.

"When we planned our interface six months ago all the chips we used were easily available", said one manufacturer.

"Now we have to wait three months for our next delivery of some vital components – and even that is just a promise, not a firm delivery date".

And it's not just delivery dates that have been affected. The shortage of silicon chips has caused prices to rise dramatically.

"All our pricing has gone haywire", he said. "One of the chips we use cost less than 10p before Christmas. Now they cost over a £1 each, and that's if we're lucky enough to get them in the first place.

"The only comfort is that it's not just our peripheral that suffers. Everyone is in the same boat".

● **Hardware galore – Page 8.**

Acorn on TV

THE Electron is the star of a new television series aimed at teaching beginners how to program properly.

Produced by Yorkshire Television, "Me and My Micro" starts on June 10.

By the end of the series of five half-hour programmes viewers will know how to write amusing games in a structured manner.

HARDWARE GALORE!

Wait for Electron add-ons is over

THE waiting is over. Hardware add-ons for the Electron are a reality – and they're available now.

After months of promises, speculation and delay, the market is beginning to be flooded with all sorts of peripherals for the Electron.

And the manufacturers promise that there's a lot more where they came from.

The first add-ons that became available to the public after the drought were the joystick interfaces from Signpoint and First Byte.

These are pieces of hardware which fit onto the expansion bus at the rear of the micro. They allow joysticks to be used to control games in place of the keyboard.

Both are supplied with software to enable the interfaces to be used with commercial games.

Printer interfaces formed the second wave of add-ons to hit the market.

Again Signpoint was the first to offer its Printport printer interface to the general public.

Attaching to the Electron's expansion bus, it enables it to use any Centronics standard printer such as the popular Epson and Seikosha models.

Another Centronics printer interface for the Electron has been produced by Broadway Electronics of Bedford.

This comes with drive software and a screen dump routine.

It also contains an 8 bit user port, allowing the Electron some of the interfacing possibilities of the BBC Micro, and has a rear expansion bus.

Sir Computers of Cardiff has also produced a Centronics printer interface. This one is supplied with an analogue-to-digital converter, allowing the use of joysticks.

This ADC, and the fact that the Sir interface has a built in edge connector, provides for further expansion of the Electron.

Not to be left out, Silicon Substrate has brought out its Electron "PR-Interface".

Self-contained, it does not require cassette based software to be loaded each time the printer is to be used.

The interface is being marketed by Micro-Aid of Cornwall. They are offering the interface, plus the new Seikosha GP-50A five inch dot matrix printer and the necessary leads, as one package.

It's not just joystick and printer interfaces that have appeared.

From Northern Computers of Frodsham comes an external ROM box for the Electron.

Made of steel and with a clear Perspex top, it allows up to eight ROM chips to be used with the Electron.

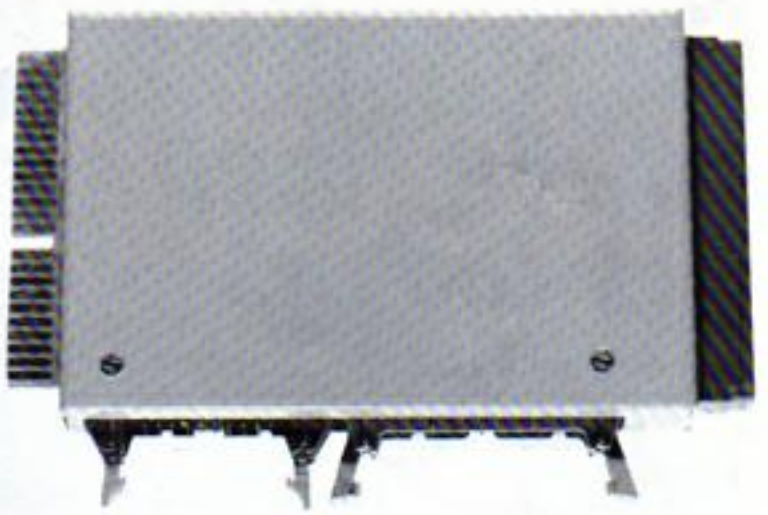
Sir Computers has also produced a ROM board which allows up to 12 ROM-based software chips to be used.

As is becoming standard with Sir products, there is scope for expansion via a rear edge-connector.

Broadway Electronics is also planning a sideways ROM board which is seen as part of whole expansion system for the Electron.

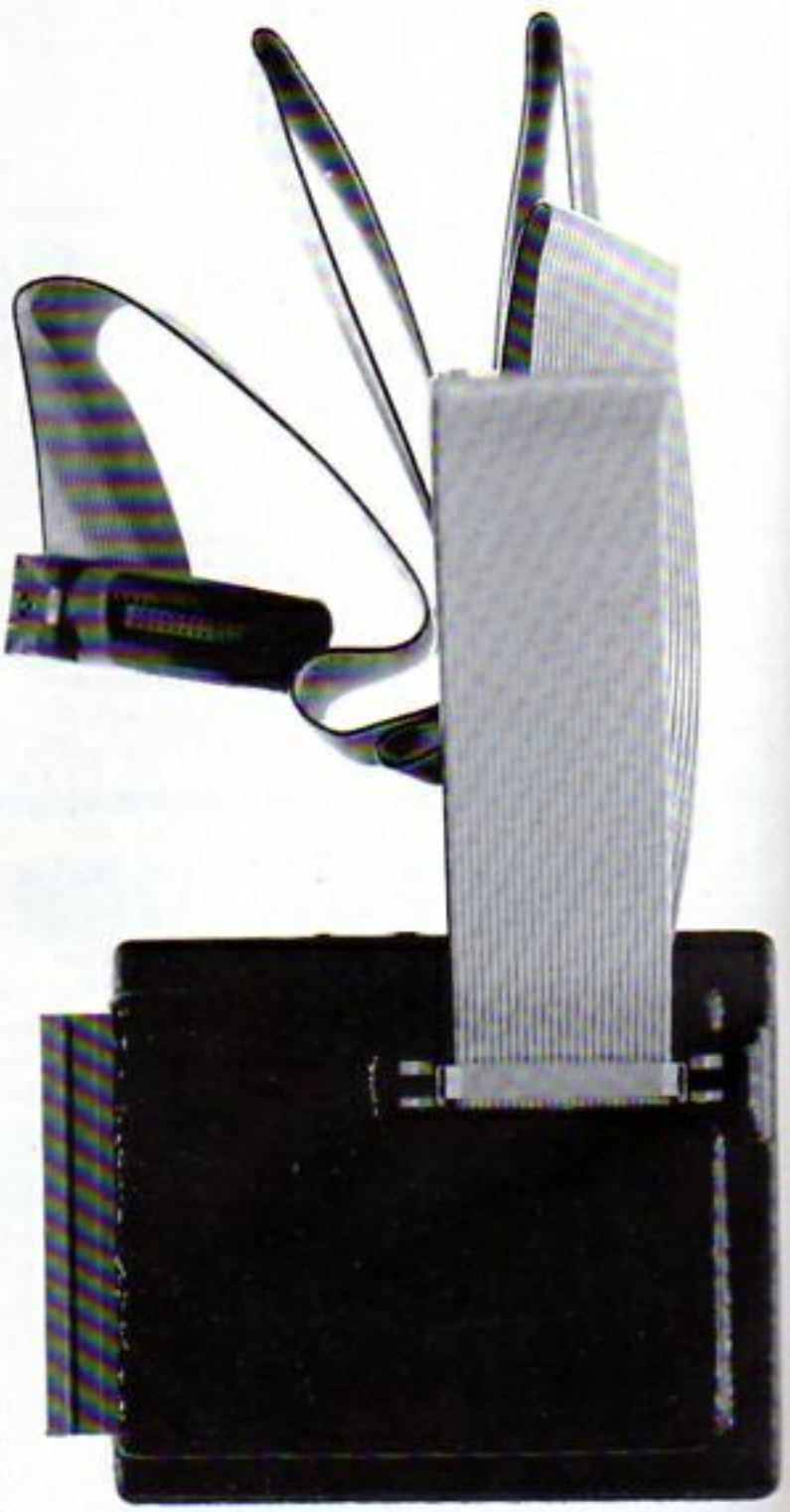
The firm intends that future add-ons will all fit on a "motherboard". This unit will plug into the back of the Electron and allow more than one add-on to be installed at one time.

Yes, things have quickly changed from a situation where Electron users were hard pressed to find an add-on for their micro. Now the difficulty is which one to choose.



Broadway printer interface and user port

First Byte joystick interface



Signpoint Printport

Signpoint Joyport

Discs on the way, too

IT will not be long before disc interfaces for the Electron are a reality.

At least two firms are putting finishing touches to their systems and hope to have them on the market by late summer.

Pace of Bradford has developed a disc interface for the Electron using the Amcom Disc Filing System.

It is capable of working with either 5¼ or 3 inch drives.

It has its own power supply – with an output for other devices – and an edge connector bus.

A prototype version was on show at the spring Electron User Show.

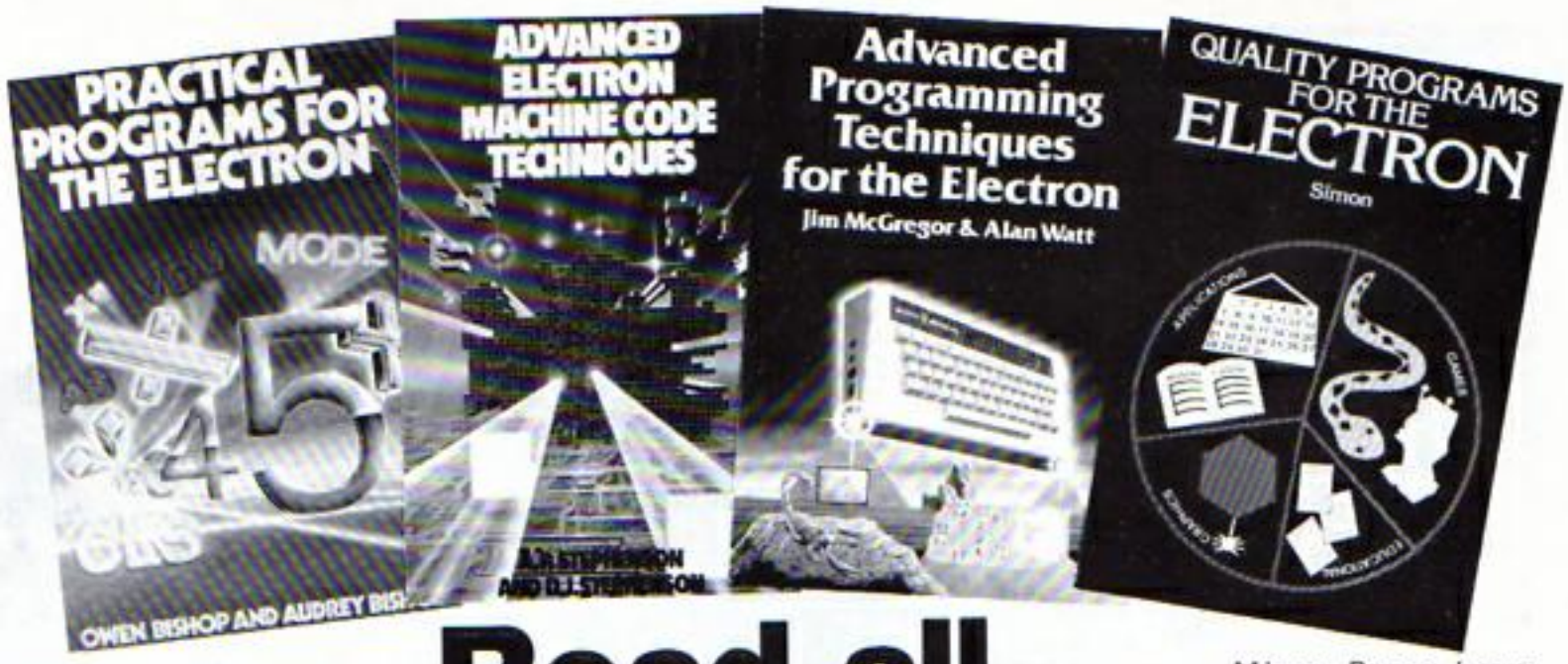
This created a huge amount of interest, and encouraged Pace to go into full production.

However, there is already a rival on the scene.

Broadway Electronics of Bedford is developing a disc interface for the Electron as part of its range of add-ons.

This will be in the form of a card that fits into the Broadway motherboard expansion system.

With the advent of these disc interfaces, the Electron becomes a sophisticated machine, outclassing any of its competitors.



Read all about it..

IT is possible that soon Electron owners could be spending more time reading about their Electrons than actually using them.

At least it seems that way from the number of books about the micro that have appeared on the market.

From Granada comes "Practical Programs for the Electron" by Owen and Audrey Bishop.

Already known for their "Take off with the Electron", the Bishops use the same simple but thorough approach in their latest book.

It gives 14 well-explained programs for the Electron, each one intended to be useful rather than just amusing.

Also from Granada comes "Advanced Electron Machine Code Techniques" by A.P. and D.J. Stephenson.

Starting where Ian Sinclair's "Electron Machine Code for Beginners" finishes, the book examines the 6502 instruction set in detail.

It also covers the use of the Electron's assembler, giving fast machine code programs for filing and indexing and shows how flicker-less animation effects can be achieved.

Another follow-up book comes from Addison-Wesley in the shape of "Advanced Programming Techniques for the Electron" by Jim McGregor and Alan Watt.

This takes the structured programming techniques used in their earlier volume – "The Electron Book: Basic, Sound and Graphics" – and expands on them.

Among the subjects explored are arcade games, databases, text programming and board games.

Micro Press have published a book of 18 listings, "Quality Programs for the Electron".

Covering games, graphics displays and utilities, each fully structured program has a detailed description.

The aim of the book is to teach good programming techniques as well as to entertain.

Finally from Prentice Hall International comes "100 Programs for the Electron" by John Gordon.

The 100 listings cover a wide range, from games to data handling, from scientific and graphics routines to business programs.

A cassette containing all the programs is also available.

Chance for authors

A GLASGOW firm, Screenplay, has hit on a novel way of both promoting its own software and encouraging people to write new programs for them.

Inside every copy of Animator, Screenplay's sprite generator for the Electron, is a competition entry form.

Entrants are asked to write an original program in either Basic or machine code using the sprites from the Animator.

As well as publishing it and giving the author royalty payments, a prize of £200 is offered for the winning program.

Even the authors of programs that don't win stand a chance of seeing their software published – and receiving payment for it.

GOOD news for Electron users whose table tops are getting cluttered. Silent Computers of London has produced a console specially for this micro.

Not only will it house the Electron itself and support a monitor and cassette recorder, but it also allows for expansion interfaces to connect to the rear of the machine.

Designed with the approach of disc interfaces in mind, there is even room for two half height disc drives.

Pad takes the toil out of plotting

HELP is at hand for frustrated contributors to Casting Agency in the form of the new Pixel-Pad from Computer Agencies.

Each pad consists of 50 sheets of A3 graph paper showing every PRINT and PLOT location for the Electron's graphics screen. They are used to plan a screen display layout.

Along the side of each sheet are twelve 8 x 8 grids, ideal for creating user-defined characters.

On the inside of the pad's cover is a brief but thorough summary of the more useful graphics commands.

Bumper packs are available for schools.

Part five of PETE BIBBY'S introduction to programming

LAST month I left you with a program to run and puzzle over. Did you guess that the answer would be 5? It's reprinted here as this month's Program I:

```
10 REM PROGRAM I
15 REM LAST MONTH'S VII
20 total=1
30 total=total+1
40 total=total+total
50 total=total+1
60 PRINT total
```

What happened was that line 20 set aside a piece of memory and labelled it *total*. It stored 1 in *total* and then the program went on to line 30.

Here the program told the Electron to take whatever value it had in *total* and add 1 to it.

Since the value already in that part of memory was 1, the sum is 2. (Do it on your fingers.)

It was then to put that value into the part of memory labelled *total*, overwriting whatever had been in there.

Now the memory labelled *total* has 2 in it.

Bearing this in mind, it should be easy to see why line 40 ends up putting 4 in *total*.

In plain English, the line would read: "Put into the memory labelled *total* the result of adding whatever is in *total* at the moment to whatever is in *total* at the moment".

Since this is 2, the result is that 4 is put into that part of memory.

Finally line 50 takes the value now held in *total* (which is 4), adds 1 to it and puts the result, 5, into *total* (or, more properly, into the memory space labelled *total*).

Line 60 just prints out the value it finds in *total*.

You'll notice that the value of *total* has varied.

At first it was 1, then it was 2, next it was 4 and finally it was 5.

You can see why it is called a variable, can't you?

All *total* represents is a value stored in the part of memory which has that label.

The value that is placed in that memory space isn't fixed. It can change during a program, just as the value in *total* did in Program I.

We use these variables all the time ourselves.

We know that when we go shopping we have to pay a bill at the cashpoint. As we go round buying things we keep a variable in our head, probably something like *total cost*.

Every time we put something into our trolley we add its price to *total cost* to keep track of how much we're going to spend.

You can see that the value of *total cost* will vary with each item we buy.

We do a calculation in our heads something like: "The new *total cost* will be the old *total cost* plus the *price* of this item".

As you can see, it's not that different from a line like:

```
total=total+1
```

The point to grasp is that variables can vary in value as you do different things to them.

They can be used until we want a final value to be returned from them, usually by a PRINT command:

```
10 REM PROGRAM II
20 gas=100
30 electricity=200
40 bill=gas+electricity
50 PRINT "The bill is ";
   bill
```

Now let's look at Program II. Run it and you'll see that it adds together the gas bill and the electricity bill to produce a total bill held in the variable *bill*. This is then PRINTed out.

We could use this same program to calculate the total bill for other values of *gas* and *electricity*.

The only problem is that we have to type out lines 20 and 30 with the new values. If we're calculating a lot of different bills this means a lot of typing.

Wouldn't it be nice if we could arrange it so that we could enter the values of *gas* and *electricity* while the program is running? Then we wouldn't have all that typing to do.

We'd just run exactly the same program over and over, putting in the new values for the variables as required.

The program would remain exactly the same. Only the variables would vary.

Program III shows how this is done, using a new Basic command INPUT.

This allows a program to be written using variables which aren't given their actual values until it is run:

```
10 REM PROGRAM III
20 INPUT gas
30 INPUT electricity
40 bill=gas+electricity
50 PRINT "The bill is ";
   bill
```

Try out the program and you'll see what I mean.

Type in RUN, press Return and all you get for your time and trouble is a question mark!

Don't worry, things haven't gone wrong (or, at least, I hope not).

What's happened is that the Electron has got to line 20, found the INPUT command and is now waiting for you to type in a number at the keyboard and press the inevitable Return.

It puts up the question mark to tell you that it's waiting.

When you get around to typing it in, it gives the variable *gas* that value.

The program then goes on to line 30, and finds another INPUT command.

It then throws up another question mark and waits for a value to be given to the variable name following the INPUT command.

So type in the value you want for *electricity*. Now that the INPUT has been satisfied, the program continues, giving us the total bill.

Easy, isn't it?

The good thing about the INPUT command is that we can now run exactly the same program and give it different variable values when it asks us for them. Try it and see.

INPUT holds up the program until you supply the required value and the Electron gives this value to the variable name following the INPUT.

The trouble is that you can forget which question mark is for which variable.

In our present case it wouldn't matter too much if we did get them mixed up. They would still add up to the same thing in the end.

However we'll soon be

Commands learnt so far:

- CLS
- NEW
- PRINT
- LIST
- RUN
- REM
- LET
- NAME$ = "LABEL"
- INPUT ✔

Discover the value of variables

writing much more complex programs and won't want to be faced with a plethora of questionable question marks.

Program IV shows how to get round this:

```
10 REM PROGRAM IV
15 PRINT "Enter gas bill"
20 INPUT gas
25 PRINT "Enter electricity
   bill"
30 INPUT electricity
40 bill=gas+electricity
50 PRINT "The bill is ";
   bill
```

What we've done is to use the PRINT command to "label" each question mark. Now if we enter the electricity bill when it should have been the gas bill, it's our own stupid fault.

Having shown you how to use PRINT to tell us what the INPUT is asking for, I'll now inform you that you don't have to bother with it at all!

Instead of using the PRINT commands you can slip your message between the INPUT and the variable name. It will be shown on the screen just as if we'd used a PRINT statement.

This can save a lot of typing. Program V shows how it's done:

```
10 REM PROGRAM V
20 INPUT "Enter gas bill"
   gas
30 INPUT "Enter electricity
   bill" electricity
40 bill=gas+electricity
50 PRINT "The bill is ";
   bill
```

Exciting stuff isn't it?

I know that this example is fairly trivial. But now that you can use the same program over and over again, with different values for the variables, you are really tapping the power of your Electron.

You may have noticed that in the last program no question marks appeared.

If you do want the question marks, just put in a comma between the message and the variable name.

Program VI shows this in action:

```
10 REM PROGRAM VI
20 INPUT "What's your
   name", name$
30 INPUT "How old are you",
   age
40 PRINT "Hello ";age;"
   year old ";name$
```

Notice that in this program I've used INPUT to allow a string to be entered into the program. It's the one with the dollar sign on the end.

Program VI is fairly silly. But notice that the same program can be run by different people and they'll get different results.

A four line program is all things to all men, courtesy of two INPUT statements!

Remember how we saved a couple of lines by putting our messages into the INPUT command?

Well in Program VII we use one INPUT statement to request values for two variables:

```
10 REM PROGRAM VII
20 INPUT "Name,age",name$,
   age
30 PRINT name$,age
```

All that's happened is that we've put the two variable names after the INPUT statement and message. To do this you just separate them by commas.

When it gets to this line the Electron will show the message as usual, putting up a question mark to tell you it's waiting for something to be input from the keyboard.

When a number or string is given to the first variable name the Electron moves on to the next variable (after the comma) and throws up a question mark until you've dealt with that.

You can have more than two variables after an INPUT statement, always provided that you separate them by commas.

The trouble is that it can get a bit complicated unless you put in more messages.

Then the lines start getting long and you've defeated your purpose.

And that's it for this month. We've looked at how variables can be used to stand for numbers that vary and we've seen how INPUT can be used.

Try writing your own programs using INPUT, maybe converting pounds to pence or hours to minutes.

INPUT is a very powerful command. When combined with other Basic commands that we will be covering next time, it really unleashes the power of your Electron.

I'll leave you with program VIII. Can you figure out what's happening?

```
10 REM PROGRAM VIII
20 total=0
30 FOR loop=1 TO 10
40 INPUT " Enter number",
   number
50 total=total+number
60 NEXT loop
70 PRINT "The total is ";
   total
```

Notebook Part 5

THE program featured in this month's Notebook comes from A.FARMER of Warrington, Cheshire.

It's a simple listing that uses the Electron's graphics commands to draw 100 randomly coloured lines on the screen, over and over again.

```
10 REM A. FARMER
20 REM RANDOM COLOURED
     LINES
30 REPEAT
40 MODE 2
50 VDU 23,1,0;0;0;0
60 count=0
70 MOVE 0,0
80 REPEAT
90 count=count+1
100 X=RND(1279)
110 Y=RND(1023)
120 GCOL 0,RND(7)
130 DRAW X,Y
140 UNTIL count>100
150 UNTIL FALSE
```

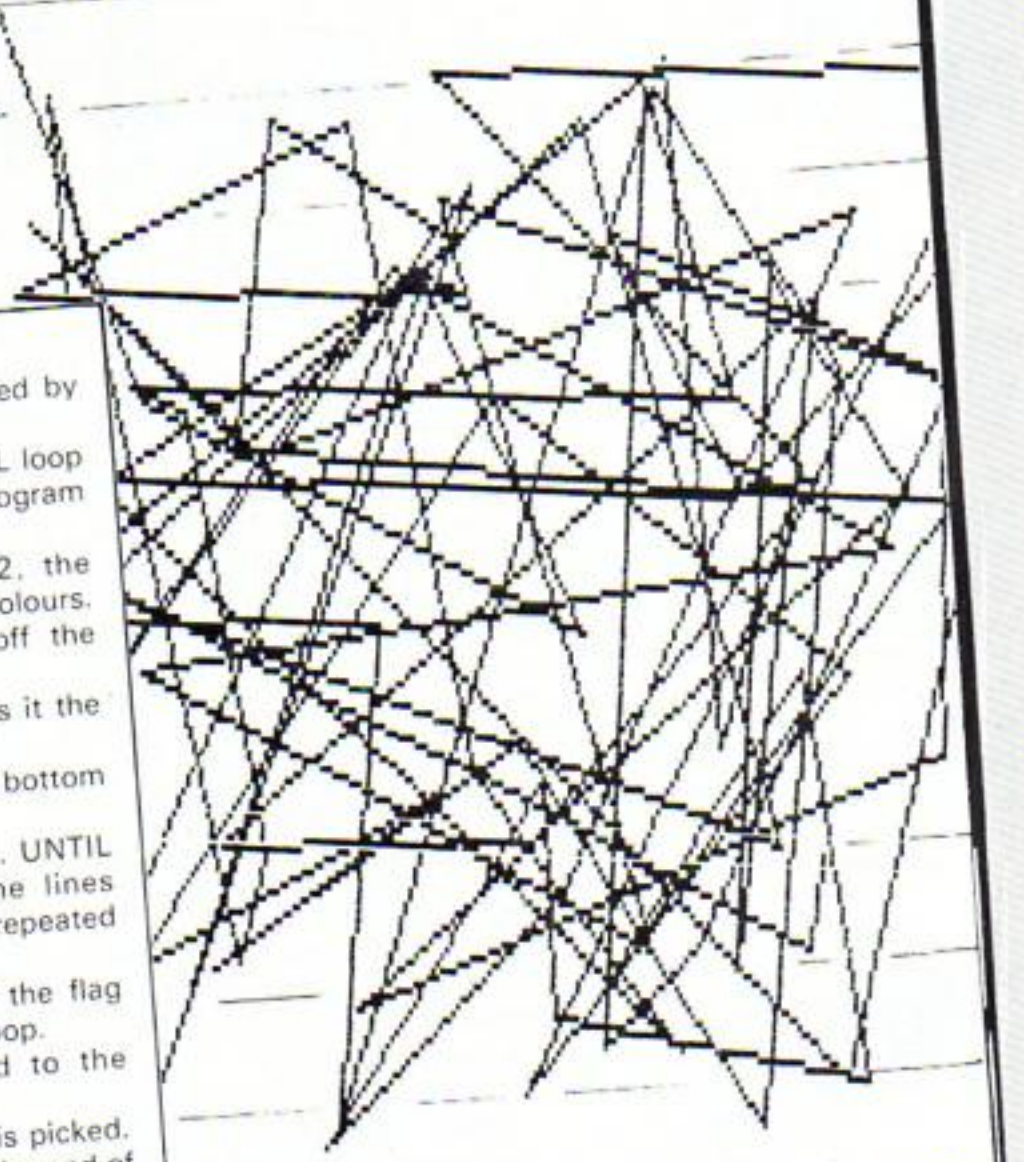
REM statements

Repeat ... until loop

Random co-ordinates

Repeat ... until loop

Lines to make lines

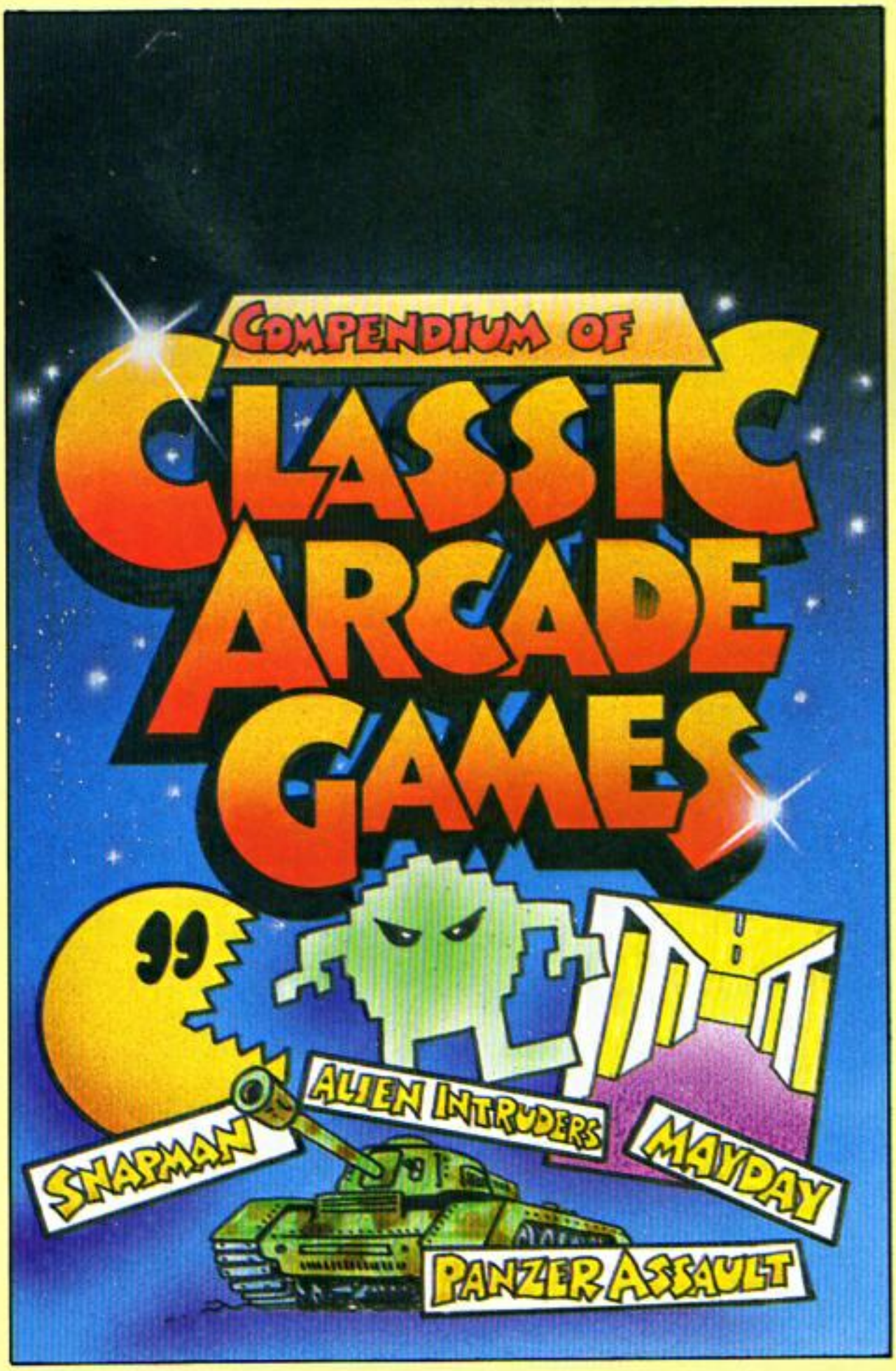


Trevor Roberts

Line No:	Description
10-20	REM statements which are ignored by the micro.
30-150	Form the first REPEAT . . . UNTIL loop which runs the main body of the program over and over again.
40	Puts the Electron into Mode 2, the graphics mode which allows 16 colours.
50	The VDU command switches off the flashing cursor.
60	Sets up a flag variable and gives it the value zero.
70	Moves the graphics cursor to the bottom left of the screen.
80-140	These lines form a REPEAT . . . UNTIL loop inside the first loop. The lines enclosed between them are repeated until the condition is fulfilled.
90	One is added to the value of the flag variable each time round the loop.
100-110	Random values are assigned to the graphics coordinates.
120	One of seven random colours is picked.
130	A coloured line is drawn from the end of the previous line to the point chosen by lines 100 and 110.
140	If the flag variable is not greater than 100 (that is less than 100 lines have been drawn) the program goes back to the REPEAT of line 80.

Here's something SPECIAL from

electron user



We've commissioned four rip-roaring games for the Electron and BBC Micro

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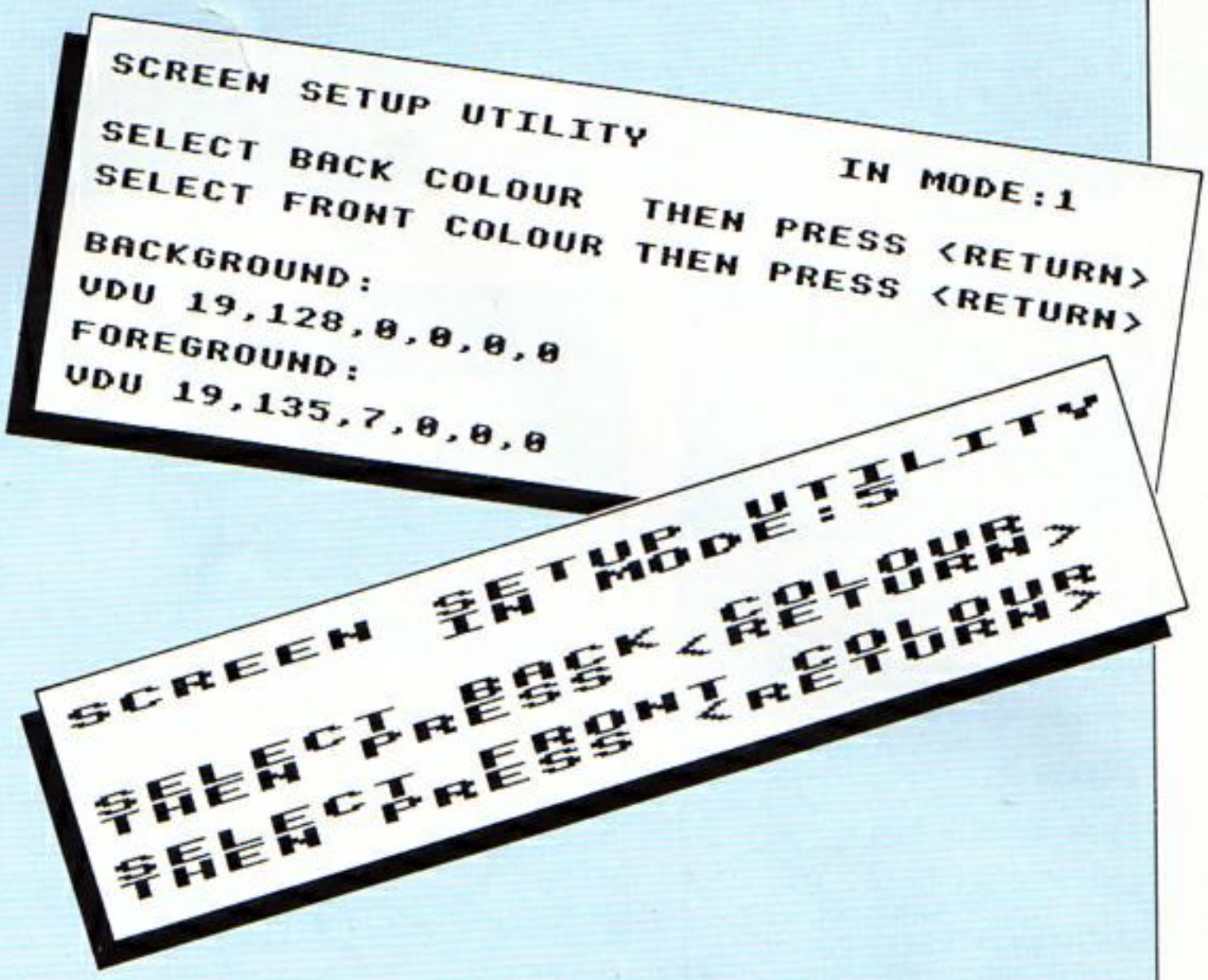

COLOUR IT QUICKLY!

Reader ANDREW OLDHAM has sent in this extremely useful program to help set up your screen colours

SETUP is a utility program designed to help the Electron user choose the background and foreground colours to be used in any mode.

At the start of the program, you are asked to enter which mode you want to use.

This can be any of the seven available and is the mode that will be used throughout SETUP.

The background colour will change first, cycling through the Electron's 16 colours.

After each colour change it will pause for a second. When the colour you want is on the screen, just press Return and the cycle will stop, leaving the background in that colour.

You then go through the same procedure with the foreground (text) colour. Again, press Return when you are satisfied with the colour.

Now the Electron displays the VDU statements which will produce that combination of background and foreground colours.

These can then be used in your own programs, making the text more colourful.

The variable *mode*, input in line 100, picks the mode that the Electron will work in.

Lines 160 to 200 form a FOR . . . NEXT loop which cycles through the background colours.

Similarly, lines 230 to 270 cause the Electron to work through the foreground colours.

The wait between each colour is determined by the INKEY of line 170. This delay can be made shorter or longer simply by changing the value in the brackets.

Lines 180 and 250 use INKEY again, this time to test if the Return key has been pressed.

If this is the case, the Electron is sent to the next section of the program.

```
10 REM SCREEN SET-UP
   PROGRAM
20 REM A.OLDHAM
30 REM (C) ELECTRON USER
40 REM **********
50 MODE 6
60 ON ERROR GOTO 330
70 PRINT '"SCREEN SETUP
   UTILITY FOR THE #ELECT
   RON#"
80 PRINT STRING$(39,"-")

90 PRINT TAB(0,10);"WHICH
   MODE DO YOU WANT TO
   USE ";
100 INPUT mode
110 IF mode<0 OR mode>6
   THEN GOTO 90
120 MODE mode
130 CLS
140 PRINT '"SCREEN SETUP
   UTILITY"SPC (7);"IN
   MODE:";mode
150 PRINT ''"SELECT BACK
   COLOUR  THEN PRESS
   <RETURN>"
160 FOR A=1 TO 15
170 key=INKEY (150)
180 IF INKEY (-74)
   THEN 220
   ELSE 190
190 VDU 19,128,A,0,0,0
200 NEXT A
210 GOTO 160
220 PRINT '"SELECT FRONT
   COLOUR THEN PRESS
   <RETURN>"
230 FOR B=1 TO 15
240 key=INKEY (100)
250 IF INKEY (-74)
   THEN 290
   ELSE 260
260 VDU 19,135,B,0,0,0

270 NEXT B
280 GOTO 230
290 PRINT ''"BACKGROUND:"''
   "VDU 19,128,";A-1;
   ",0,0,0"
300 IF B=1
   THEN B=8
310 PRINT '"FOREGROUND:"''
   "VDU 19,135,";B-1;
   ",0,0,0"
320 END
330 REPORT
   :PRINT " at line ";ERL
340 END
```

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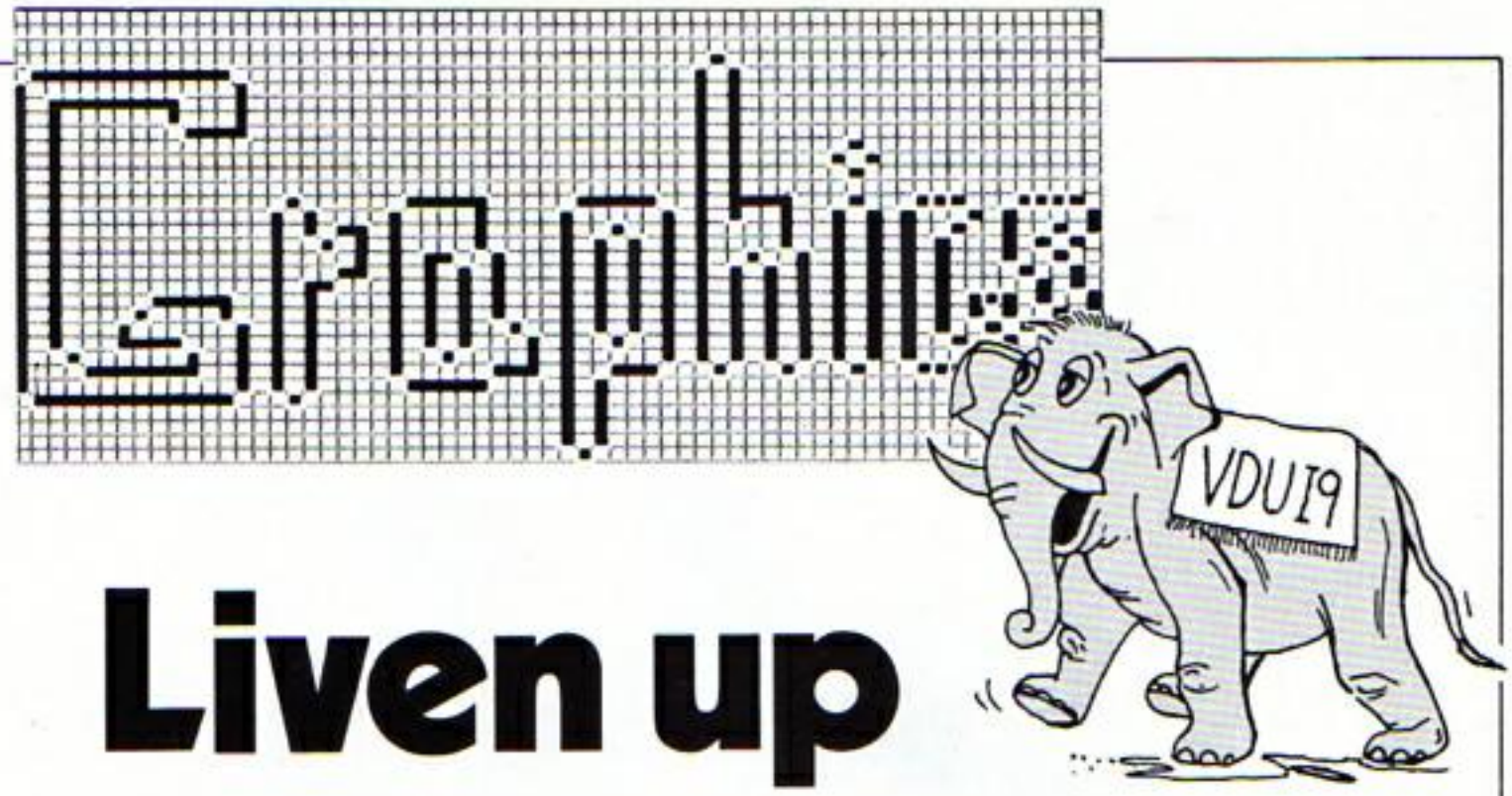


Liven up your screen with VDU19

MIKE MACMANUS delves deeper into Electron graphics

WE have already covered the use of the VDU19 command to change the text colours available to us in any mode. Now we'll be looking at some of the ways these VDU19s can be used to liven up the screen.

This will give us a lot of practice using them. Hopefully, by the time the article is finished, a mention of VDU19 will hold no fears.

Anyway, let's get straight on to the first program:

```
10 REM PROGRAM I
20 MODE 5
30 VDU 23,1,0;0;0;0;
40 PRINT TAB(2,5)"THIS IS
   A MESSAGE"
50 REPEAT
60 palette=RND(7)
70 VDU 19,3,palette,0,0
   ,0
80 FOR delay=1 TO 1000
   :NEXT
90 UNTIL FALSE
```

I'll admit that this isn't the world's most exciting bit of Basic, and the results won't amaze and astound your friends.

It does, however, contain some important points. Let's have a good look at it.

Lines 10 to 30 just tell you what the program is called, put the Electron into Mode 5 and switch off the flashing cursor.

Line 40 prints the message in the inverted commas onto the screen, three spaces in from the left and six lines down from the top.

If the positioning seems odd, remember the first space and line are both numbered 0.

Lines 50 to 90 produce an endless REPEAT... UNTIL loop which does all the colour changing.

Line 60 just gives the variable *$palette* a random value.

This variable is then used in line 70's VDU19 command to reassign the colour that will appear wherever we've previously written in colour code 3.

Everything displayed under that colour code number will turn to the new colour defined by *$palette*. Line 80 just delays things for a while so we can see what's happening.

The Electron then carries on around the loop, each time giving a random value to *$palette*.

The colour codes (logical colour numbers) and palette colours (actual colour numbers) are shown in the familiar-looking Figure I.

So by putting a VDU19 command into a loop we can get a flashing message on the screen.

And before you say that we can have flashing colours anyway, remember that these are limited to only a few combinations such as blue and yellow.

You can get any combination of the Electron's colours by using VDU19 in a loop. I leave that for you to try.

Program II is a variant of the last program.

Here two messages are printed on the screen. The first is printed by line 40 and is in the default colour code, code 3.

In Mode 5 this appears as white (until we do something about it with a cunning VDU 19).

Line 50 selects the text colour as colour code 2, which is defaulted to yellow. The program then runs into the endless REPEAT... UNTIL

→

```
10 REM PROGRAM II
20 MODE 5
30 VDU 23,1,0;0;0;0;
40 PRINT TAB(2,5)"THIS IS
   A MESSAGE"
50 COLOUR 2
60 PRINT TAB(2,15)"AND THIS
   IS ALSO"
70 REPEAT
80 palette=RND(7)
90 VDU 19,3,palette,0,0
   ,0
100 FOR delay=1 TO 1000
   :NEXT
110 UNTIL FALSE
```

MODES 0, 3, 4, 6

Logical number		Colour (on entering mode)
Fore-ground	Back-ground	
0	128	Black
1	129	White

MODES 1, 5

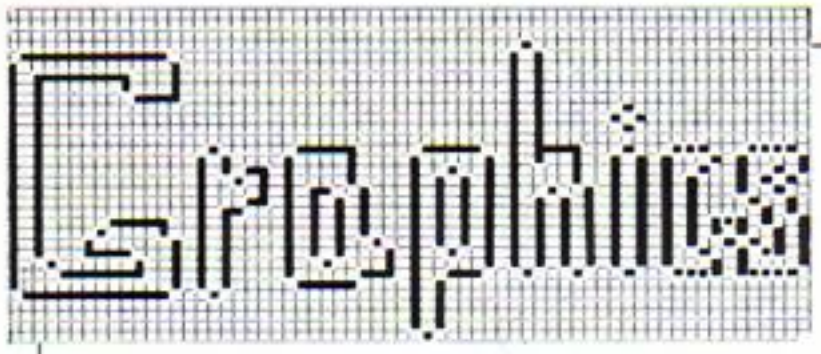
Logical number		Colour (on entering mode)
Fore-ground	Back-ground	
0	128	Black
1	129	Red
2	130	Yellow
3	131	White

MODE 2 (and actual colours)

Logical number		Colour (on entering mode)
Fore-ground	Back-ground	
0	128	Black
1	129	Red
2	130	Green
3	131	Yellow
4	132	Blue
5	133	Magenta
6	134	Cyan
7	135	White
8	136	Flashing black-white
9	137	Flashing red-cyan
10	138	Flashing green-magenta
11	139	Flashing yellow-blue
12	140	Flashing blue-yellow
13	141	Flashing magenta-green
14	142	Flashing cyan-red
15	143	Flashing white-black

The logical colour numbers on entering mode 2 are also the actual colour numbers

Figure I



colour code 1 black	colour code 2 black	colour code 3 black	colour code 4 black	colour code 5 black	colour code 6 black	colour code 7 black

Figure II: The spaces and their colour codes

From Page 19

loop formed by lines 70 and 110.

This does the same as the previous program's loop, randomly changing the palette colour assigned to colour code 3 each time round.

The result is that the first part of the message is changing colour all the time. The second part of the message, which has been written in colour code 2, stays unchanged.

This can be quite useful when you're creating eye-catching displays, such as sets of games instructions.

Program III takes the techniques of the previous two programs to produce a three line display. Each of these lines is a different colour and the colours change in sequence.

It's simple and can be quite effective. The only hard bit is figuring out the maths which decides which palette number is to be assigned to which colour code.

```
10 REM PROGRAM III
20 MODE 5
30 VDU 23,1,0;0;0;0;
40 PRINT TAB(2,5)"THIS IS
    A "
50 COLOUR 2
60 PRINT TAB(2,15)"ROLLING
    COLOUR"
70 COLOUR 1
80 PRINT TAB(2,25) "DISPLAY"
90 REPEAT
100 FOR X=6 TO 4 STEP -1
110 VDU 19,3,X MOD 3+1,0
    ,0,0
120 VDU 19,2,(X-1)MOD 3+1
    ,0,0,0
130 VDU 19,1,(X-2)MOD 3+1
    ,0,0,0
140 FOR DELAY=1 TO 1000
    : NEXT DELAY
150 NEXT X
160 UNTIL FALSE
```

Lines 10 to 80 should be fairly familiar by now. Lines 90 and 160 form the familiar endless REPEAT... UNTIL loop.

What's different is that we now have three VDU19s instead of one and there's a FOR... NEXT loop in there as well.

Don't worry too much if you can't understand what's happening in the loops. All you have to be aware of is that each of the VDU19s is working on a different colour code.

The VDU19 in line 110 controls the colour code 3, the one in 120 controls the colour code 2.

I leave it up to you to figure out which colour code the VDU19 in line 130 controls.

By using each of the VDU19s in turn to change the palette colour assigned to each colour code we can cause the colours of the text to rotate in sequence.

The FOR... NEXT loop and the MOD operator are just a technique to make sure that only three palette colours are assigned to the colour codes 1, 2 and 3 and that each line has a different colour.

As I said earlier, don't worry too much if the maths that rotates the colours seems a little obscure.

It's quite simple really when you get used to it and will be covered in a future Maths Workout in *Electron User*.

You don't need much maths ability to understand Program IV:

```
10 REM PROGRAM IV
20 MODE 5
30 PRINT TAB(5,2)"HELLO
    THERE"
40 COLOUR 130
50 FOR X=0 TO 19
60 FOR Y=5 TO 28
70 PRINT TAB(X,Y)" "
80 NEXT
90 NEXT
```

All that's happening is that the message is being printed on the screen by line 30. The next line changes the background text colour to yellow and the FOR... NEXT loop prints out a rectangle of yellow squares.

The program is trivial but if you think of the message as a score table and the yellow part as a playing area you might see its application.

The trouble is that printing all those yellow spaces onto the screen is rather messy. Program V shows a rather neater way of achieving the same result.

```
10 REM PROGRAM V
20 PRINT "HELLO THERE"
30 MODE 5
40 VDU 23,1,0;0;0;0;
50 PRINT TAB(5,2)"HELLO
    THERE"
60 VDU 19,2,0,0,0,0
70 COLOUR 130
80 FOR X=0 TO 19
90 FOR Y=5 TO 28
100 PRINT TAB(X,Y)" "
110 NEXT
120 NEXT
130 VDU 19,2,3,0,0,0
```

What's happened is that the VDU19 of line 60 has assigned the palette colour 0 (black) to the colour code 2. So now anything that is printed in colour code 2 will appear black instead of the previous yellow.

The program then carries on as before printing the rectangle of spaces onto the screen. Only this time they are black, not yellow (because of line 60's VDU).

Since the background is already black, when we print on it with our black spaces nothing appears to happen.

The Electron isn't bothered though. It knows which part of the screen is the black background (colour code 0) and which parts have had spaces printed on them in colour code 2.

Never mind that both colours are black. To the Electron some parts are in colour code 0 and some are in colour code 2 and it's not bothered if humans are too thick to know the difference.

Once the Electron has finished handling the FOR... NEXT loops it goes onto line 130.

Here the VDU19 tells it that everyhting printed in colour code 2 is now to appear yellow (palette number 3). The result is that the yellow rectangle appears as if by magic.

This technique of reassigning a colour code to the background colour, invisibly writing a message on the screen in that colour and then using a VDU19 to make it suddenly appear, can be very effective.

A simple VDU19 can be used to switch parts of a message on and off in a most impressive manner.

The technique can even be used to produce a very simple form of animation, as Program VI shows.

```
10 REM PROGRAM VI
20 MODE 2
30 VDU 23,1,0;0;0;0;
40 FOR code%=1 TO 15
50 VDU 19,code%,0,0,0,0
60 COLOUR 128+code%
70 PRINT TAB(3+code%,15);
   " "
80 NEXT code%
90 REPEAT
100 FOR code%=1 TO 15
110 VDU 19,code%,7,0,0,0

120 FOR pause=1 TO 500
   :NEXT
130 VDU 19,code%,0,0,0,0

140 NEXT
150 UNTIL FALSE
```

There's nothing very hard about it. It just uses all the techniques we've covered in the programs.

Lines 10 to 30 tell us the program number, put the

colour code 8 black	colour code 9 black	colour code 10 black	colour code 11 black	colour code 12 black	colour code 13 black	colour code 14 black	colour code 15 black

micro into Mode 2 and switch off the flashing cursor.

The FOR . . . NEXT loop in lines 40 to 80 print out 15 spaces in a row. If you look at the VDU19 in line 50 you'll see that by the time the Electron has gone round the loop 15 times, the colour codes 1 to 15 have all been assigned the palette colour 0, which is black.

Figure II shows how the 15 spaces are laid out, along with their colour code number.

The trouble is that we can't see them on screen, as the program has arranged for them all to be black. And, unlike the Electron, we can't tell these black spaces from the black background.

So if we can't see it why bother doing it? The endless REPEAT . . . UNTIL loop of lines 90 to 150 supplies the answer.

This uses two VDU19s in a FOR . . . NEXT loop to produce the effect of a rectangle moving across the screen from left to right.

The first VDU19 in line 110 gives a colour code (selected by *$code%*) the palette number 7 (white).

Then, after a short delay, the VDU19 of line 130 makes the same colour code stand for black again. This is, in effect, switching each space "on" for a short time and then "off".

The FOR . . . NEXT loop ensures that this happens to each of the 15 spaces in turn and this gives the effect of animation. Figure III shows what is happening.

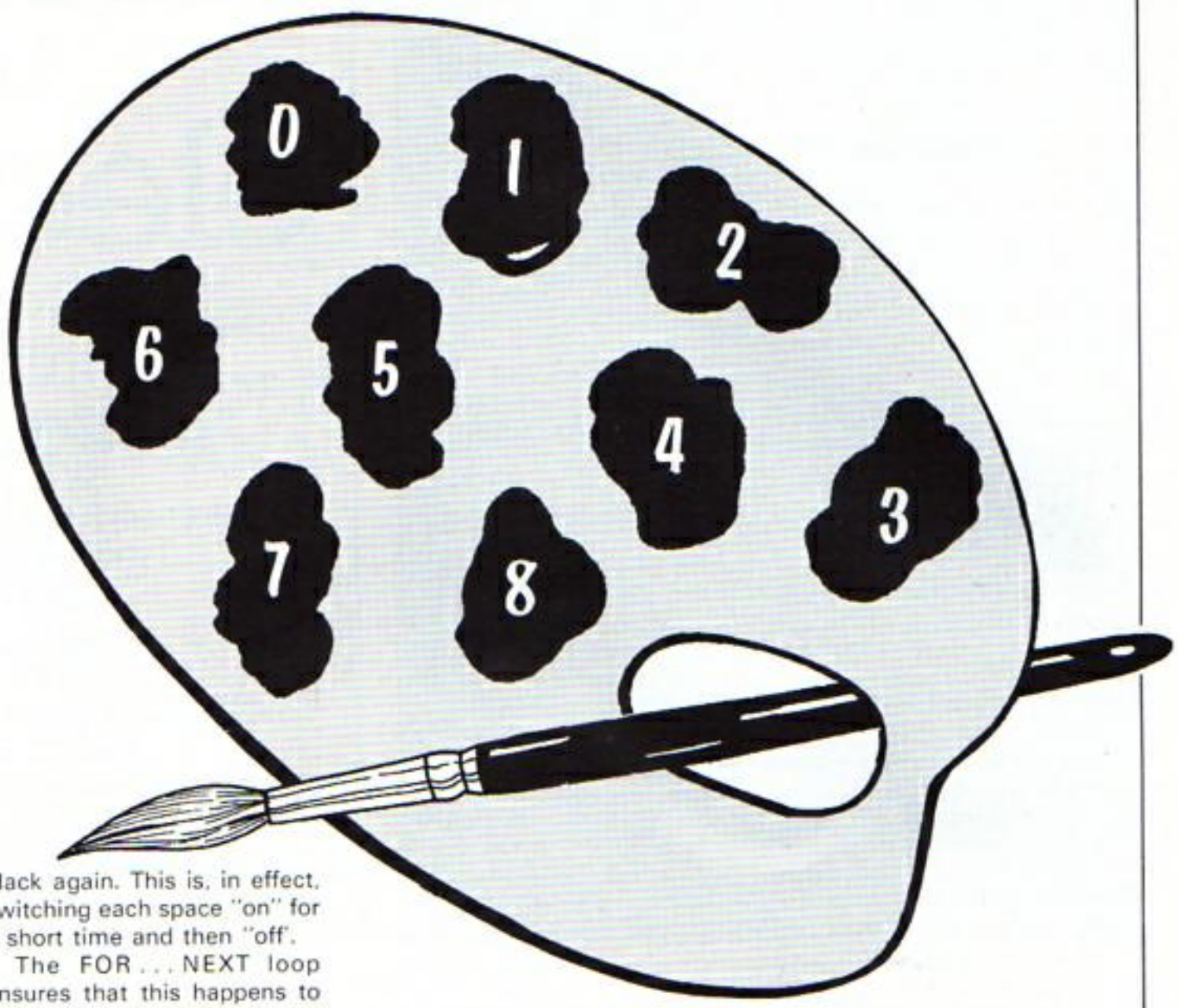
So as you can see, there's a lot we can do with VDU19s to enliven our screen display. You'll only learn by doing, so have a go at changing Program VI.

Can you make it work in different colours? Is it possible to make it go from right to left as well as left to right?

And is it possible to get the same effect going upwards?

Try it and see.

And while you're doing that I'll be getting on with the next article, which will explore drawing lines with the Electron.



colour code 1 palette code 7 white	colour code 2 palette code 0 black	colour code 3 palette code 0 black		colour code 14 palette code 0 black	colour code 15 palette code 0 black
colour code 1 palette code 0 black	colour code 2 palette code 0 black	colour code 3 palette code 0 black		colour code 14 palette code 0 black	colour code 15 palette code 0 black
colour code 1 palette code 0 black	colour code 2 palette code 7 white	colour code 3 palette code 0 black		colour code 14 palette code 0 black	colour code 15 palette code 0 black

Figure III: How the white spaces "move" to the right

Electron Software

BUSINESS & LEISURE

From **Gemini**

Business Packs - £19.95 per program

INVOICES & STATEMENTS

This program greatly reduces the time and cost of preparing Invoices and Statements by storing essential information such as customer names, addresses and account numbers, VAT routines and footer messages such as 'Please remit by return', 'Overdue and outstanding', etc.

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Games

Missile Control *£9.95*

Widely acknowledged by the trade and press as being the definitive version of this arcade classic for the Electron. Stunning graphics and as many screens as you can manage. Joystick or keyboard, 4 player option, smart bombs, planes, satellites, demo mode, hi-score; it's all in this one!

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Consists of ACCORDION, GIN RUMMY, PIQUET and BACKGAMMON

Using the full potential of the Electron's colour graphics, these games allow the users to achieve a sound level of competence against a reasonably proficient opponent...THE COMPUTER!

The full and comprehensive manual, contains detailed rules for playing, plus hints on how to improve your play... until you can consistently beat the computer, at which point you should be ready to take on most players for modest stakes!

1 DATABASE

The Gemini Database is a program designed to enable the user to store all types of information in similar format to a card indexing system. Information may be stored under your own defined headings, and the Gemini Database contains other important facilities such as alpha and numerical sorting, calculations, finding records that meet specific requirements, line printer routines, browsing, etc. An invaluable first 'serious' program for any Electron user.

SPREAD SHEET ANALYSIS

Perhaps the most commercially successful item of business software yet written, the Spread Sheet processor offers a very wide range of invaluable calculation and editing features.

Consider, for example, a Cash Flow forecast containing rows and columns of figures, combined with text and numbers. If, say, the cash receipts for January need to be changed, it would normally be necessary to delete and re-calculate several figures for each successive month.

With SPREAD SHEET, however, an 'on screen' amendment to the January figure is made, and the corrected figures for each successive month automatically appear upon touching the 're-calculate' key.

Formulae cells in the table may be specified which relate to each other and then copied RELATIVELY or ABSOLUTELY to other parts of the program, which in itself is modular, and directly linkable to other Gemini programs.

The sister program GRAPHPLOT will take data from disk or tape files created by this program to provide data portrayal in graph, histogram or pie chart format.

GRAPH PLOT

Written specially for use with the Electron, this program makes full use of the high resolution colour graphics to provide an easily assimilated visual representation of numerical data.

For example monthly sales statistics comparing two year's results may be instantly converted into two side by side pie charts, histograms or graphs... for easier visual comparison and assimilation.

GRAPH PLOT also incorporates a built in machine code screen dump, enabling a high resolution printed image to be produced using an Epson or similar bit image compatible printer. It also interfaces with other Gemini programs such as Spread Sheet Analysis and is particularly recommended where any kind of mathematical plotting facility is required.

MAILIST

A superb dedicated database to allow for manipulations of names and addresses and other data. Gemini's unique 'searchkey' system gives you a further ten 'user-defined parameters' to make your own selections. Features include the facility to find a name or detail when only part of the detail is known, it will print labels in a variety of user specified formats.

EASILEDGER

Contains routines to enable the small businessman to keep a record of one of the most important aspects of his business—cash flow.

EASILEDGER is essentially a debit/credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information. Its flexibility lies in its ability to produce account balances instantly for debtors and creditors, together with a record of all transactions, dates and references. A year-to-date summary of sales, purchases, receipts and payments over the twelve month period is also provided as is a complete INTERACTIVE bank account database.

STOCK CONTROL

Dedicated software with all that's necessary to keep control of stock. This program will take the tedium out of stock control and save time and money. Routines include stock set up, user reference number, minimum stock level, financial summary, line print records, quick stock summary, add stock, delete/change record and more.

HOME ACCOUNTS

Designed as a complete Home Accounting package this program allows the user to set up a budget for items of household expenditure and compare actual expenditure with budget. A running total of all surpluses and deficits is available both as digits, and in the form of a bar chart.

A complete Bank account routine is included together with suggested expenditure categories such as mortgage, rent, rates, telephone, gas, electricity, etc, however, these may be deleted or augmented without difficulty.

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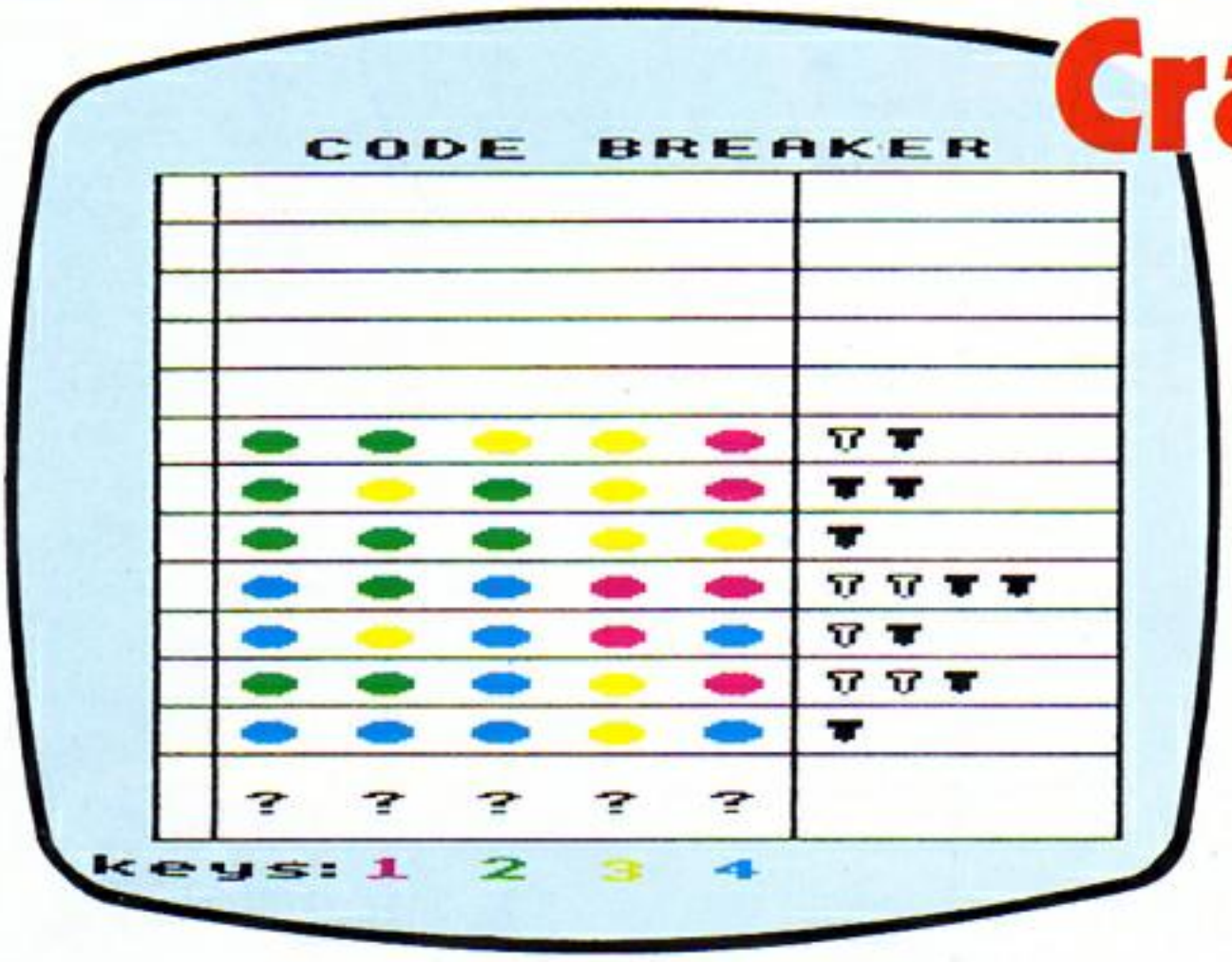
SPECIAL OFFER: Deduct £1 per cassette when ordering two or more.

Can you work out the colour sequence in this brain teaser by ROLAND WADDILOVE?

Crack the code!



THIS is a game in which you have to crack a secret code.

The code consists of different colours and you can have 12 goes at it.

Pressing one of the numbered keys will place a colour, and Delete will erase it.

A black peg means one of the colours is the right one and in the right place.

A white peg means one of the colours is the right one but in the wrong place.

Press the space bar to start.

```
10 REM ** Code Breaker
   **
20 REM ** By R.A.Waddilove
   **
30
40 MODE 6
50 PROCinitialise
60 PROCinstructions
70 MODE 2
80 REPEAT
90 PROCset_variables
100 PROCprint_board
110 PROCset_code
120 REPEAT
130 PROCinput_guess
140 PROCcheck_guess
150 UNTIL correct OR guesse
    s=12
160 IF correct
    THEN PROCgot_it
    ELSE PROCfailed
170 PROCanother_game
180 UNTIL key$="n"
    OR key$="N"
190 MODE 6
200 PROCtidy_up
210 END
220
230 DEF PROCinstructions
240 VDU 19,1,6,0,0,0
250 PRINT 'TAB(10);"CODE
    BREAKER"
260 PRINT TAB(9);"---------
    -----"
270 PRINT "This is a game
    in which you have
    to""crack a secret
    code."
280 PRINT '"The code consis
    ts of different colours
    ""and you can have
    12 attempts at it."
290 PRINT '"Pressing one
    of the numbered keys
    will""place a colour
    , and delete will
    erase""it."
300 PRINT '"A black peg
    means that one of
    the""colours is the
    right colour and in
    the""right place."
310 PRINT '"A white peg
    means that one of
    the""colours is the
    right colour but in
    the""wrong place."
320 PRINT '"Press the space
    bar to start...";
330 REPEAT
340 UNTIL GET$ =" "
350 ENDPROC
360
370 DEF PROCinitialise
380 VDU 23,224,60,126
    ,255,255,255,255,126
    ,60
390 VDU 23,225,124,68
    ,108,40,40,40,40,16
400 VDU 23,226,124,124
    ,124,56,56,56,56,16
410 DIM code(5),guess(5)
420 DIM marked_answer(5)
430 DIM marked_guess(5)
440 *KEY10 "OLD |M RUN
    |M"
450 *FX229,1
460 *FX4,1
470 ENDPROC
480
490 DEF PROCset_variables
500 guesses=0
510 COLOUR 5
520 PRINT TAB(1,15);"How
    many colours?";
    TAB(4,18);"Press 4
    - 7 ";
530 REPEAT
540 level=GET -48
550 UNTIL level>3 AND level
    <8
560 correct=0
570 ENDPROC
580
590 DEF PROCprint_board
600 CLS
610 COLOUR 7
620 PRINT TAB(4) "CODE
    BREAKER"
630 PRINT TAB(3,27);"?
    ? ? ? ?"
640 PRINT TAB(0,31) "keys:";
650 FOR i=1 TO level
660 COLOUR i
    : PRINT ;i;" ";
670 NEXT i
680 FOR i=208 TO 976
    STEP 64
690 MOVE 96,i
    : DRAW 1160,i
700 NEXT i
710 MOVE 96,96
    : DRAW 1160,96
720 MOVE 160,96
    : DRAW 160,976
730 MOVE 96,96
    : DRAW 96,976
740 MOVE 800,96
    : DRAW 800,976
750 MOVE 1160,96
    : DRAW 1160,976
760 SOUND 1,-15,50,5
770 ENDPROC
780
790 DEF PROCset_code
800 FOR i=1 TO 5
810 code(i)=RND(level)
820 NEXT i
830 ENDPROC
840
850 DEF PROCinput_guess
860 *FX21,0
```

PROCEDURES

370 PROCinitialise Defines the characters used – a coloured circle, a white peg and a black peg. Sets up the arrays used, switches off the Escape key and cursor keys, redefines the Break key.

230 PROCinstructions Prints the instructions.

490 PROCset_variables Sets the difficulty level.

590 PROCprint_board Draws the grid, prints the title and colours used.

790 PROCset_code Sets the secret code.

850 PROCinput_guess Allows you to type in your guess. Only the colours up to and including level are allowed. As long as there is one colour present you can use Delete. Guess() stores the colours.

1030 PROCcheck_guess Marks the blacks first. Stores whether a colour in the answer or your guess has been marked or not. Leaves if all five colours are right. Marks the whites. A white peg is given only if neither the answer nor your guess has been marked before.

1300 PROCgot_it Flashes the title and makes a sound. Calls PROCdisplay_answer to confirm that it is correct.

1400 PROCfailed Prints FAILED, makes a low sound, calls PROCdisplay_answer to show what it was.

1630 PROCanother_game Asks if you want to play again.

1800 PROCtidy_up Restores the cursor keys and Escape key.

1740 PROCpause(delay) Waits for the length of time in the brackets.

VARIABLES

code() Stores the secret code.

guess() Stores your guess when you type it in.

marked_answer() Stores whether a colour in the code has been marked or not.

marked_guess() Stores whether a colour in your guess has been marked or not.

correct TRUE if you have cracked the code.

guesses The number of guesses made.

level The difficulty level – the number of colours used.

i Used as a counter in loops.

colour The colour printed and placed in guess().

keys The key presses when asked if you want to play again.

```
870 guesses=guesses+1
880 PRINT TAB(3,26-2*guesse
    s);
890 i=0
900 REPEAT
910 i=i+1
920 REPEAT
930 colour=GET -48
940 IF i>1 AND colour=79
    THEN PRINT CHR$ 8;
    CHR$ 127;
    : i=i-1
950 UNTIL colour>0
    AND colour<=level
960 SOUND 1,-15,100,1
970 guess(i)=colour
980 COLOUR colour
990 PRINT CHR$ 224;
    CHR$ 9;
1000 UNTIL i=5
1010 ENDPROC
1020
1030 DEF PROCcheck_guess
1040 COLOUR 7
1050 FOR i=1 TO 5
1060 IF guess(i)=code(i)
    THEN PROCblack_peg
    ELSE marked_answer(i)=
    FALSE
    : marked_guess(i)=FALSE
1070 NEXT i
1080 IF correct=5
    THEN ENDPROC
1090 correct=0
1100 FOR i=1 TO 5
1110 FOR j=1 TO 5
1120 IF guess(j)=code(i)
     AND NOT marked_answer(
    i) AND NOT marked_guess
    (j)
    THEN PROCwhite_peg
1130 NEXT j
1140 NEXT i
1150 ENDPROC
1160
1170 DEF PROCblack_peg
1180 PRINT CHR$ 225;
1190 correct=correct+1
1200 marked_answer(i)=TRUE
1210 marked_guess(i)=TRUE
1220 ENDPROC
1230
1240 DEF PROCwhite_peg
1250 PRINT CHR$ 226;
1260 marked_answer(i)=TRUE
1270 marked_guess(j)=TRUE
1280 ENDPROC
1290
1300 DEF PROCgot_it
1310 COLOUR 8
1320 PRINT TAB(4,0);"CODE
     BREAKER";
1330 SOUND 1,-15,100,20
1340 PROCpause(500)
1350 COLOUR 7
1360 PRINT TAB(4,0);"CODE
     BREAKER"
1370 PROCdisplay_answer
1380 ENDPROC
1390
1400 DEF PROCfailed
1410 COLOUR 15
1420 PRINT TAB(3,27);" FAILE
    D  ";
1430 PRINT CHR$ 8;
1440 SOUND 1,-15,0,20
1450 PROCpause(500)
1460 PROCdisplay_answer
1470 ENDPROC
1480
1490 DEF PROCdisplay_answer
1500 PRINT TAB(3,27);"
          ";TAB(3,27);
1510 FOR i=1 TO 5
1520 SOUND 1,-15,100,5
1530 COLOUR code(i)
1540 PRINT CHR$ 224;
    CHR$ 9;
1550 PROCpause(50)
1560 NEXT i
1570 COLOUR 15
1580 PRINT TAB(0,31);"
     press space...  ";
1590 REPEAT
1600 UNTIL GET$ =" "
1610 ENDPROC
1620
1630 DEF PROCanother_game
1640 CLS
1650 COLOUR 3
1660 PRINT TAB(3,4);"Do
     you want to";TAB(4
    ,6);"play again ?"
1670 COLOUR 1
1680 PRINT TAB(3,9);"(press
     Y OR N)";
1690 REPEAT
1700 key$=GET$
1710 UNTIL INSTR("YyNn"
    ,key$)
1720 ENDPROC
1730
1740 DEF PROCpause(delay)
1750 TIME =0
1760 REPEAT
1770 UNTIL TIME >delay
1780 ENDPROC
1790
1800 DEF PROCtidy_up
1810 *FX4,0
1820 *FX229,0
1830 VDU 14
1840 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

A joy to use...

THOUGH few of us admit it, most people buy a home micro for two basic reasons – either to learn to program, or to play games.

It's because of this that Signpoint's Joyport is potentially the most useful interface developed for the Electron that I have come across.

Before you all jump from your chairs and wail about spreadsheets, home accounts, recipe programs and the like, let me explain.

To communicate with the outside world *(that means YOU)* the micro needs some kind of interface, such as the keyboard.

You "talk" to the programs through the keyboard. Whether you need to hammer the spacebar or type in thousands of figures on the Electron, you must use the keyboard.

Fine so far, but what if you can't type or you don't have good use of both hands? Or if you want pinpoint accuracy to move a cursor to within a fraction of an inch of a point on screen?

That's where a joystick comes in handy.

Like it or not, the joystick is a very useful piece of hardware. Unfortunately, the standard Electron doesn't have the ability to handle joysticks.

This is where the Joyport comes in.

Housed in a neat little plastic box, the unit hangs piggyback-fashion on the Electron's expansion bus. This is the piece of printed circuit board that emerges from the back of the micro.

I say "hangs" because the unit is supported solely by its connection to the micro, reminiscent of the early Sinclair computers.

This, of course, means that a micro with a Joyport is a bit tricky to sit on your lap. Don't forget though, this is a micro – not the pet cat!

The Joyport has been wired to accept most of the Atari type switched joysticks. This is very much in its favour since:

- Switched joysticks are probably more suitable for playing games.
- A wide range of switched joysticks is available.
- Switched joysticks start from about £10 upwards for a single unit.

The documentation supplied with the Joyport is adequate, though some people may find the printing a little small to read.

A nice touch is that the manual gives complete modifications to some of the programs on the Welcome tape, enabling them to be controlled with a joystick.

One point not made clear in the manual is that you must turn the Electron off before you insert or remove the Joyport. Otherwise damage may result to the computer and/or unit.

If by now you're wondering what the catch is, the answer is simple. As yet very little commercial software is compatible with the Joyport.

However Signpoint have got the solution. A simple assembly language program, supplied as a listing with the package, shows how to patch many commercial games to the unit.

In conclusion, the Joyport is a terrific piece of hardware and well worth the money.

But before you go and buy one, remember you will be lucky if it's compatible with all of your commercial software.

This however is a problem that will face all joystick interfaces for the Electron and doesn't detract from an impressive piece of equipment.

Marcus Adams

...now test it yourself

THIS game is designed to be a simple demonstration of the Joyport at work. However, if you haven't got one you can still play it by using the keyboard.

What you have to do is to kill the spacemen with the laser as fast as possible.

The laser is aimed using the + shaped cursor, which is moved around the screen using either the joystick or the keyboard.

MAJOR INTEGER VARIABLES

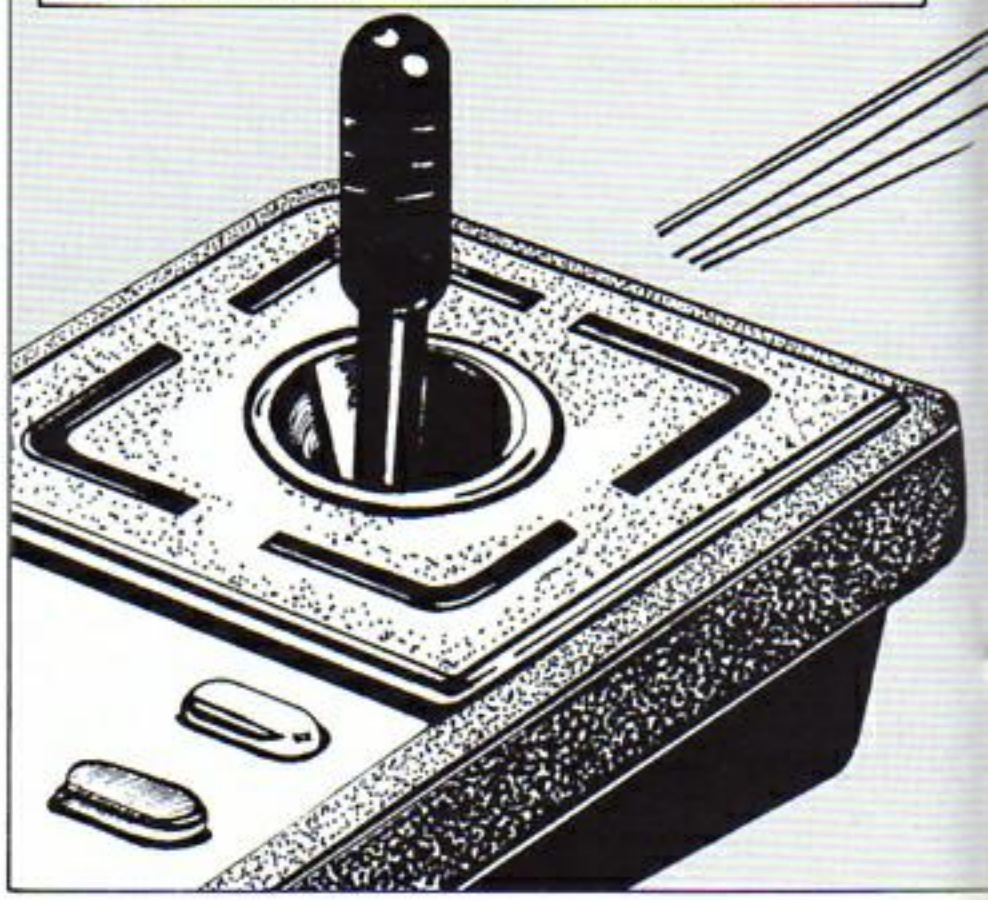
X%	Present X coordinate of cursor.
Y%	Present Y coordinate of cursor.
x%	Last X coordinate of cursor.
y%	Last Y coordinate of cursor.
mx%	Present X coordinate of man.
my%	Present Y coordinate of man.
on%	How many turns spaceman has been on screen for.

SPECIAL VARIABLES

left	Number returned by the Joyport if stick moved left.
right	Number when stick moved right.
up	Number when stick moved up.
down	Number when stick moved down.
fire	Number when fire button pressed.
loc%	The location to PEEK (?) to get the value from the Joyport.

PROCEDURES

PROCplot	Moves cursor to new X,Y coordinate.
PROCinput	Gets value from joystick.
PROCkey	Gets value from keyboard.
PROCshoot	Prints "laser burst" and checks for hit.
PROCmoveman	Decides whether it is time, to move the spaceman. If it is then moves him.
PROCinit	Initialises the start of play.
PROCman (X%,Y%)	Plots spaceman at X,Y coordinate.



```
10 REM Laser shoot out
20 REM (c) electron user
    1984
30 REPEAT
40 MODE 6
   :VDU 19,0,4;0;
50 sc%=0
60 PRINT TAB(10,5) "LASER
    SHOOTOUT"
70 PRINT TAB(8,10)"Keyboard
    or joystick? (0/1)"
80 REPEAT
90 *FX 15,1
100 key% = GET -48
110 UNTIL key%=0 OR key%=1
120 IF key%=0
    THEN PRINT ''"A = Up"'
    "Z = Down"'"< = Left"'
    ">  = Right"''"Press space
    bar"
   :REPEAT UNTIL 32=GET
130 MODE 5
140 PROCinit
150
160 REPEAT
170 PROCinput
180 PROCplot
190 PROCmoveman
200 VDU 19,2,RND(6);0;
210 UNTIL sc%>=1000
220 VDU 4
    :PRINT TAB(0,4)"You win
     alien!"
230 *FX15,1
240 TIME =0
    :REPEAT UNTIL TIME >=
     300
250 PRINT TAB(0,8)"Press
     space bar"
260 REPEAT UNTIL 32=GET
270 UNTIL 0
280
290 DEF PROCplot
300 VDU 5
    :GCOL 3,3
310 MOVE X%,Y%
320 VDU 43
330 DEF PROCfstplot
340 VDU 5
    :GCOL 3,3
350 MOVE x%,y%
360 VDU 43
370 x% = X%
    :y% = Y%
380 ENDPROC
390
400 DEF PROCinput
410 IF key%=0
    THEN PROCkey
    :ENDPROC
420 IF ?loc%=0
    THEN ENDPROC
430 IF (?loc% AND up)=up

    THEN Y%=Y%+16
440 IF (?loc% AND down)=down

    THEN Y%=Y%-16
450 IF (?loc% AND left)=left

    THEN X%=X%-32
460 IF (?loc% AND right)=righ
    t
    THEN X%=X%+32
470 IF (?loc% AND fire)=fire

    THEN PROCshoot
480 ENDPROC
490
500 DEF PROCkey
510 IF INKEY (-66)
    THEN Y%=Y%+16
520 IF INKEY (-98)
    THEN Y%=Y%-16
530 IF INKEY (-103)
    THEN X%=X%-32
540 IF INKEY (-104)
    THEN X%=X%+32
550 IF INKEY (-99)
    THEN PROCshoot
560 ENDPROC
570
580 DEF PROCshoot
590 GCOL 3,1
600 MOVE 0,0
    :DRAW x%+32,y%-16
610 MOVE x%+32,y%-16
    :DRAW 1280,0
620 MOVE x%+32,y%-16
    :DRAW 1280,0
630 MOVE 0,0
    :DRAW x%+32,y%-16
640 SOUND &10,-15,6,1
650 IF POINT(X%+12,Y%-20)<>2

    THEN ENDPROC
660 SOUND &11,1,200,200
    :TIME =0
    :REPEAT UNTIL TIME >=20
    :SOUND &11,0,0,0
    :sc%=sc%+50-on%
    :on%=50
    :VDU 4
    :PRINT TAB(11,0);sc%
670 ENDPROC
680
690 DEF PROCmoveman
700 on%=on%+1
710 IF on%<=49 ENDPROC
720 on%=0
730 PROCman(ax%,ay%)
740 ax%=RND(1220)
    :ay%=RND(990)
750 PROCman(ax%,ay%)
760 ENDPROC
770
780 DEF PROCinit
790 COLOUR 3
    :PRINT TAB(8,0)"Sc:0"
800 COLOUR 3
810 loc% = &FD40
820 X% = 640
    :Y% = 512
830 x% = 640
    :y% = 512
840 on%=49
850 left=2
    :right=1
860 up =8
    :down =4
870 fire=16
880 ax%=RND(1220)
    :ay%=RND(990)
890 VDU 23,224,&28,&FE,&38
    ,&10,&FE,&BA,&BA,&BA
900 VDU 23,225,&BA,&BA,&BA
    ,&28,&28,&28,&28,&6C
910 ENVELOPE 1,128,-1,0
    ,0,40,0,0,126,0,0,0
    ,126,126
920 PROCman(ax%,ay%)
930 PROCfstplot
940 ENDPROC
950
960 DEF PROCman(X%,Y%)
970 VDU 5
980 GCOL 3,2
990 MOVE X%,Y%
1000 VDU 224,8,10,225
1010 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

NIGEL PETERS examines multi coloured user-defined characters

What are aliens made of?

THIS month we'll be looking at Alien, a program sent in to us by Christopher Skelsey. It draws a weird-looking spaceman on the screen using the VDU23 user-defined characters we've come across in Casting Agency.

However it goes one step further, in that the spaceman is multicoloured. Type in the program, run it and see for yourself. Let's find out how it works.

Lines 10 and 20 are the usual REM statements. These mean nothing to the Electron but tell us what the program is called and who wrote it.

Line 30 selects Mode 2, the sixteen colour mode, while line 40 tells the Electron to print characters in COLOUR 2, which is green.

The basic outline of our alien is made up of nine user-defined characters. These are defined in lines 50 to 130 and their positions are shown in Figure I.

Lines 140 to 170 use VDU23 to define four more shapes, but for the moment we'll ignore these and pass onto the PRINT commands in lines 180 to 210.

These use the TAB command to place the nine user-defined characters we saw earlier on the screen in the shape of the alien.

If you want to prove this to yourself run the program leaving out lines 140 to 170 and any after 220. This will show you what the remaining lines do.

Don't, however, go to the bother of deleting the lines you don't want. After all, if you get rid of lines 140 to 170 you'll have to type them in again later if you want the program to work properly.

But there is a simpler way – a tip I got from the editor of *The Micro User.*

If you want the micro to ignore a line (which is usually when you're trying to figure out what that line contributes to the program) just use the Copy key to copy that line and put a REM after the line number.

So if you want to see what the effect of leaving out line 140 is, just copy:

```
140 VDU23,233,0,0,0,0,
    0,0,0,36
```

and put in a REM as in:

```
140 REM VDU23,233,0,0,
    0,0,0,0,0,36
```

Now the Electron will ignore that line when the program is run. If we want to use it again we just re-copy it leaving out the REM and the line will work.

This saves a lot of typing and can be quite a useful guide as to what a line is doing in a program.

The rule is, if you're not sure what it's doing there, REM it and see what happens when the Electron ignores it.

Anyway, back to the Alien. We've got as far as line 220, which sets the foreground text colour to flashing red.

This puzzles me as I can't figure out where it is used. Try REMing it and see if you can. I've left it in "for possible future expansion".

Line 230 takes us into a whole new dimension of user-defined graphics by joining the text and the graphics cursor.

This allows us to use the graphics commands of the

```
10 REM ALIEN (OR PROGRAM
   I)
20 REM BY CHRISTOPHER
   SKELSEY
30 MODE 2
40 COLOUR 2
50 VDU 23,224,129,195
   ,66,36,24,60,126,255
60 VDU 23,225,0,0,0,64
   ,64,68,84,84
70 VDU 23,226 ,255,126
   ,126,126,60,24,24
   ,24
80 VDU 23,227,92,124
   ,60,24,24,24,24,24
90 VDU 23,228,255,255
   ,255,255,255,255,126
   ,126
100 VDU 23,229,24,24,248
   ,248,0,0,0,0
110 VDU 23,230,0,0,0,0
   ,14,15,15,15
120 VDU 23,231,102,102
   ,102,102,102,102,231
   ,231
130 VDU 23,232,0,0,0,0
   ,112,240,240,240
140 VDU 23,233,0,0,0,0
   ,0,0,0,36
150 VDU 23,235,0,0,36
   ,24,0,0,0,0
160 VDU 23,236,0,0,36
   ,24,36,0,0,0
170 VDU 23,237,129,129
   ,0,0,0,0,0,0
180 PRINT TAB(1,1);
   CHR$ (224);CHR$ (225)
190 PRINT TAB(1,2);
   CHR$ (226);CHR$ (227)
200 PRINT TAB(1,3);
   CHR$ (228);CHR$ (229)
210 PRINT TAB(0,4);
   CHR$ (230);CHR$ (231);
   CHR$ (232)
220 COLOUR 14
230 VDU 5
240 GCOL 0,11
   :MOVE 65,990
   :VDU 233
250 *FX9,5
260 *FX10,5
270 GCOL 0,0
   :MOVE 65,960
   :VDU 235
280 GCOL 0,8
   :MOVE 65,1000
   :VDU 237
290 GCOL 0,0
   :MOVE 65,925
   :VDU 236
300 PRINT
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

Program I: Alien

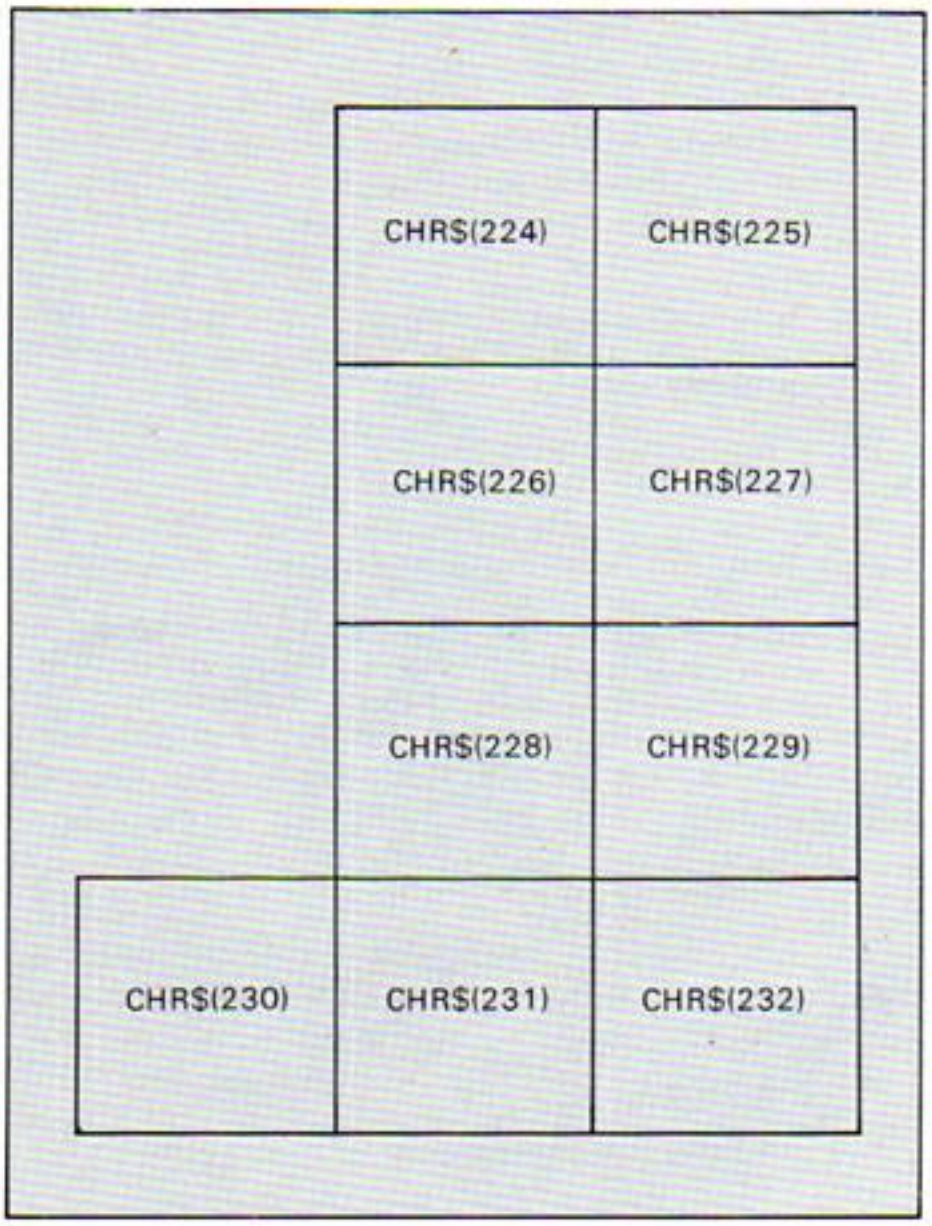
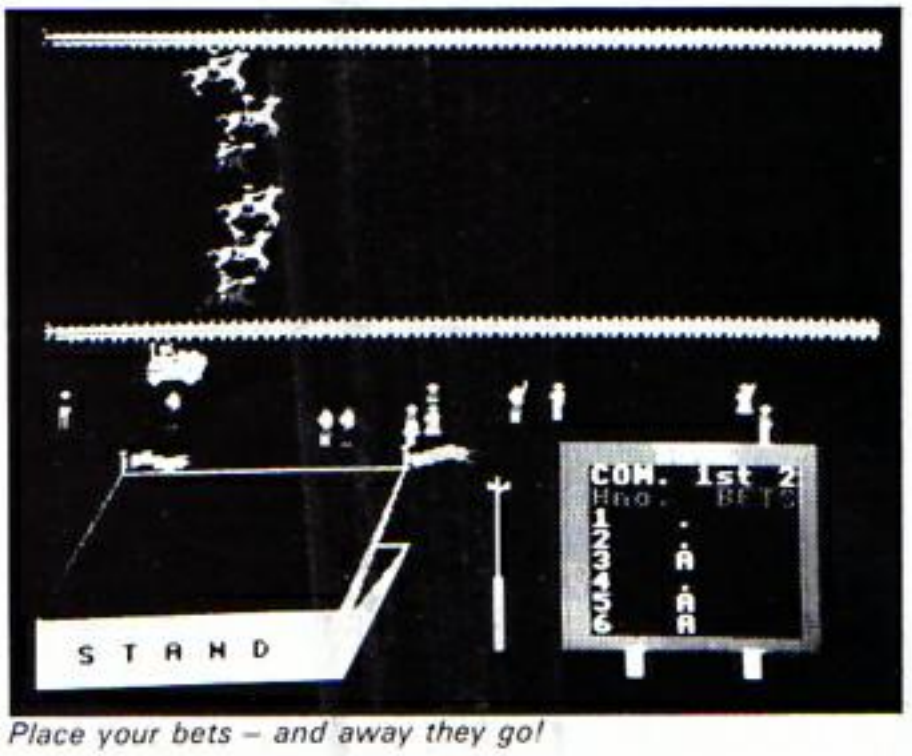


Figure I: The Alien's character pattern

Software Surgery

THE COLUMN THAT TAKES A LOOK INSIDE THE LATEST RELEASES

For once you can afford to be a loser



Place your bets – and away they go!

Horserace
Dynabyte Software

ARE you a betting man? Do you hate losing money? Then there's the perfect answer in a game called Horserace.

Allowing up to six players, it gives all the excitement of a day at the races without risking the cash.

A totaliser showing the betting possibilities, plus a betting slip, flash on your screen.

All you have to do is choose your horse and state how much money from your £1,000 you wish to place, press the space bar and you're away.

The graphics are particularly striking, with flags, a grandstand, waving crowds and even jockeys tumbling from realistic horses. It's usually your jockey!

The first three horses past the post are printed on a tote board near the stand and an all-too-accurate check is also kept on your financial position.

But never mind, you can afford to be rash – just this once.

Alan Turner

Into battle

Johnny Reb
Lothlorien

HAVING never before tried a war game (is this the right term?) it was with some trepidation and not a little interest that I loaded Johnny Reb.

However I think I could quite easily get addicted now!

The object is to select an army of your own devising and, by out-manoeuvring a second player, or the Electron, capture the enemy army's flag a predetermined number of times.

The scenario is a confrontation at a river crossing during the American civil war.

The program, which is recorded on both sides of the cassette, loads in two parts.

The first plays 'Dixie', displays the Confederate flag and loads in the main program.

You are then given various options – one or two player game, whether you want to be the Johnny Rebs or the Blue-bellies, what units you want in your army, if you want a time limit and if so, what?

You can choose to play a friend or, by choosing the one player option, the computer.

Your army can consist of up to 20 units of each of cavalry, infantry or artillery.

If you are playing the computer it can choose a force numerically equal to yours but not necessarily consisting of the same number of each unit.

When you have made your choices the battleground is displayed.

This display and the placement of troops on it, is random. But I noticed a tendency for the Electron's army to keep being slightly more favourably placed than mine!

Each army in turn makes a move for each of its pieces. After one complete move by each army the battleground is scanned and updated.

The first army to capture the enemy army's flag a certain number of times – or alternatively to destroy all the enemy – wins.

So what is it like to play? Well, it's like playing a cross between toy soldiers and chess.

If it seems that the enemy will get you, you can always give them a blast from a cannon.

I found I liked to play with the maximum number of pieces (60), without a time limit.

If you are called down for tea there is a save-game facility.

Enclosed with the program is a cassette-sized leaflet containing seven pages of rules. But I found the program very user-friendly, causing only occasional reference to the instructions.

Some things I didn't like. My major complaint is that the more I played it the slower it seemed to get.

After completely exterminating the enemy army (my one and only time) it took about half a minute, while the program scanned the enemy battlefield for troops and then again for score-checks, for it to announce that I had won.

Another thing I'd like to see changed is the method of calling the save-game routine.

I found myself calling it up several times by inputting 'S'

(save) when I had meant to input 'M' (move), Return 'S' (SOUTH).

Perhaps if you had to type in SAVE this problem wouldn't arise. The error-trapping on the Break key didn't seem to be quite right, but that probably serves me right for messing about with it.

Overall, a little on the slow

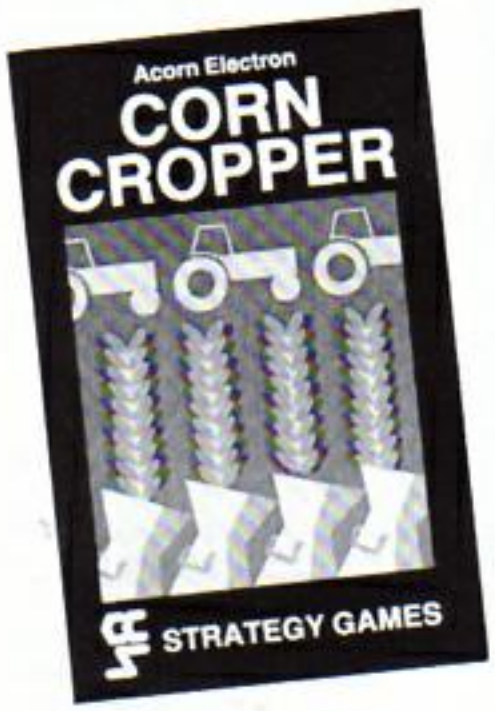
→

From Page 35

side. Nevertheless it's a compulsive game that will keep your interest longer than the average arcade game.

And it will still be going strong when you have solved that latest adventure. Good value for money.

Merlin



Down on the farm

Corn Cropper
Cases Computer Simulations

AN unusual new game for those older ones among you who fancy taking all the decisions, Corn Cropper can really grab your attention.

It brings all the harrowing (sorry!) decisions involved in running a farm into your front room. But don't be deterred!

There are five levels of difficulty. The higher the level, the greater the adversity. So start at the lower levels.

The object of the exercise is to increase your initial assets of £50,000 to £250,000 over 55 months.

You are asked to take decisions as to planting, irrigation, harvesting and selling.

You are not on your own though. To help you make decisions, the Electron gives generous monthly bulletins on the weather, crop progress and your cash flow situation.

All in all, a challenging program with a nifty rendition of "The Archers" tune to boot! Hope that doesn't put you off.

Keith Wilmot

Mission from Camelot

Quest for the Holy Grail
Epic Software

YET another superb adventure from Epic. This time you aspire to join King Arthur's round table at Camelot.

Unfortunately it is not quite as simple to join as you thought. In fact Arthur decides that you will have to perform a deed of valour to prove your worthiness.

After much deliberation he decides that the task you will have to perform is to find and return the Holy Grail.

To this there are gasps of amazement from the assembled knights and one even shouts "Impossible!"

How right he is! I've been trying for the last two weeks so I should know!

You start your quest on a hilltop outside Camelot. Your first task is to explore the surrounding forest.

You will find various objects scattered around here and two very annoying knights who won't actually attack you but do insist on refusing to let you pass.

You eventually come to a large tree. You can climb it with a ladder and a plank (hint!) and even fall partway down through the branches before climbing down to the ground.

But unless I'm missing something, you can't then climb back up it!

Your next task is to find your way through the swamp. Here the save game facility is a life-saver, literally!

Once through the swamp you have another one of those knights to thwart. But providing you have successfully investigated the surrounding countryside you shouldn't have any real problem here.

Once the knight is vanquished you have a magnificent castle to explore, complete with dungeons, secret passageways leading to mysterious and distant

locations and doors that refuse to open.

I shan't tell you any more about the adventure – I couldn't if I wanted to. This is where I got stuck!

Suffice to say that there are about 230 locations, of which I visited about 100, a maximum possible score of

Action – with logic

Seawolf
Optima Software

SEAWOLF from Optima Software is a new kind of war game, combining logic with action.

You set about destroying the enemy fleets in the submarine Seawolf, trying your best not to get wiped out in the process.

You can start off as a rating, where the enemy (bless his sporting heart) gives you a run for your money, and end up as a captain, where the enemy (the swine) will try and squelch you as soon as you poke your nose outside the base.

The game has two phases. The first is the long range scan where you select your target from the fleet.

The second phase is where you line up the target in your sights and let fly with either torpedoes or lasers.

An average Seawolf target can absorb about 12 hits from torpedoes, and half as many from the lasers before becoming a kill.

All the time you're attacking, if the target is a warship you are sustaining damage from his counterattack. The kills accumulate, and 15 is a completed mission.

Unfortunately the damage accumulates as well and 100 per cent means curtains.

You can, however, return to base between attacks if you so wish and "zeroise" the damage.

That way you are certain to successfully complete the mission, but at the same time almost "zeroise" any excitement.

Choosing "soft" civilian targets is an easy way of ending up with 15 kills.

I did this quite often (I suppose you could say I'm just a sheep in Seawolf clothing.!)

Anyway, Seawolf is slightly different, but I thought only just above average. Available graphics are under-utilised, and I would have liked to see more colour used.

Also more imagination could have gone into representing the target ship – whether it be a tanker or a battleship, the image is exactly the same.

Having said that, if you want a war game that is out of the ordinary and isn't just zapping aliens then Seawolf will fit the bill.

Derek Schofield

8,000 (I got 2,000) and about 140 words recognised by the program.

The puzzles are superb and I think praise is due to the program's writer.

As is usual with Epic, a small cassette insert gives general instructions and a synopsis of all their other adventures.

The game loads in three parts. The first program displays the Epic logo and produces a merry little tune.

The second gives background information on the scenario, with some simple commands to get you started and then loads the main program.

Overall, while I wouldn't recommend it to an absolute beginner, it is a superb adventure and excellent value for money. Compulsive!

I think having now tried all three of the Epic adventures, that they must be the yardstick by which all future adventures for the Electron should be judged.

P.S. If anyone gets those doors open, please let me know how you did it!

Merlin

Fastest game in the Galaxy...

OMEGA PROBE
Optima Software

TIRED of solving adventure games? Fed up with educational programs and glutted with amazingly boring utilities?

Well why not go back to where it all began and zap aggressive aliens from a far off galaxy? And when you do, make sure that you have a go at Optima Software's latest Electron game, Omega Probe.

The scenario is fairly familiar. You are in command of a drone ship investigating the Omega sector, the last great space frontier.

The local aliens look on you as a hostile force and launch a mass unprovoked attack. You have to defend yourself as best you can.

What is unfamiliar is the speed. It's the fastest game for the Electron that I've come across so far. The aliens come at you thick and fast, sliding across the screen.

Wasters, Ouchers, Pursuit and Interceptor Drones hurtle at you as you do your best to evade and fight them off. The graphics have to be seen to be believed.

The controls are well designed and easy to use. You even get the choice of using joysticks, both the Signpoint Joyport and the First Byte joystick interface work with the game.

This adds a whole new dimension to the game (if that's possible).

It is engrossing and compulsive, the kind of game that you see someone playing and immediately want a go yourself.

And if it's you that's playing you don't want to let anyone else have a go. Recommended.

Alan Coombes

Into real space

Space Shuttle
Microdeal

EVER wondered what it must be like to sit atop several million pounds of thrust as it blasts you skywards toward a minute hole through which you must pass?

Ever thought how difficult it must be trying to link up with an object the size of an armchair in the vast emptiness of space while both of you are hurtling around the earth at 17,000 miles an hour?

What goes through your mind as you pilot the world's biggest and most expensive glider toward a minute strip of tarmac, knowing that you'll only get one chance, balancing height and speed to make a good or disastrous landing?

Stop wondering. Cease thinking. Put yourself out of your misery. See for yourself.

Microdeal has got it all on cassette. Space Shuttle encompasses all these things.

You lift off and pilot the shuttle toward a small "window" to achieve a successful orbit near a satellite you have to reclaim.

Your progress is plotted on a screen on your instrument display board.

Once successfully established in orbit you dock with the satellite and retrieve it with your mechanical arm.

Retro fire slows you down and you re-enter the earth's atmosphere and pilot the shuttle down to the landing strip.

Easy, hey? Just you try it! One millimetre out on blast off or re-entry and you rendezvous with neither the satellite nor landing strip and no points are scored.

A mite too heavy with your thrusters on docking and you end up spinning out of control or crashing into the satellite – with no points.

Fail to balance your height and speed correctly on approach and you end up as yet another crater – again no points.

The easiest part is picking up the satellite with the shuttle's arm. Sad to say, these are often the only points I can pick up, and I've been at it for ages.

For your money you get a full instrument display, a panoramic view through your windscreen and an extremely interesting and absorbing game.

Any section at which you fail is aborted and the next section is started, so you always complete the game, even if you're a complete "no-no" like me.

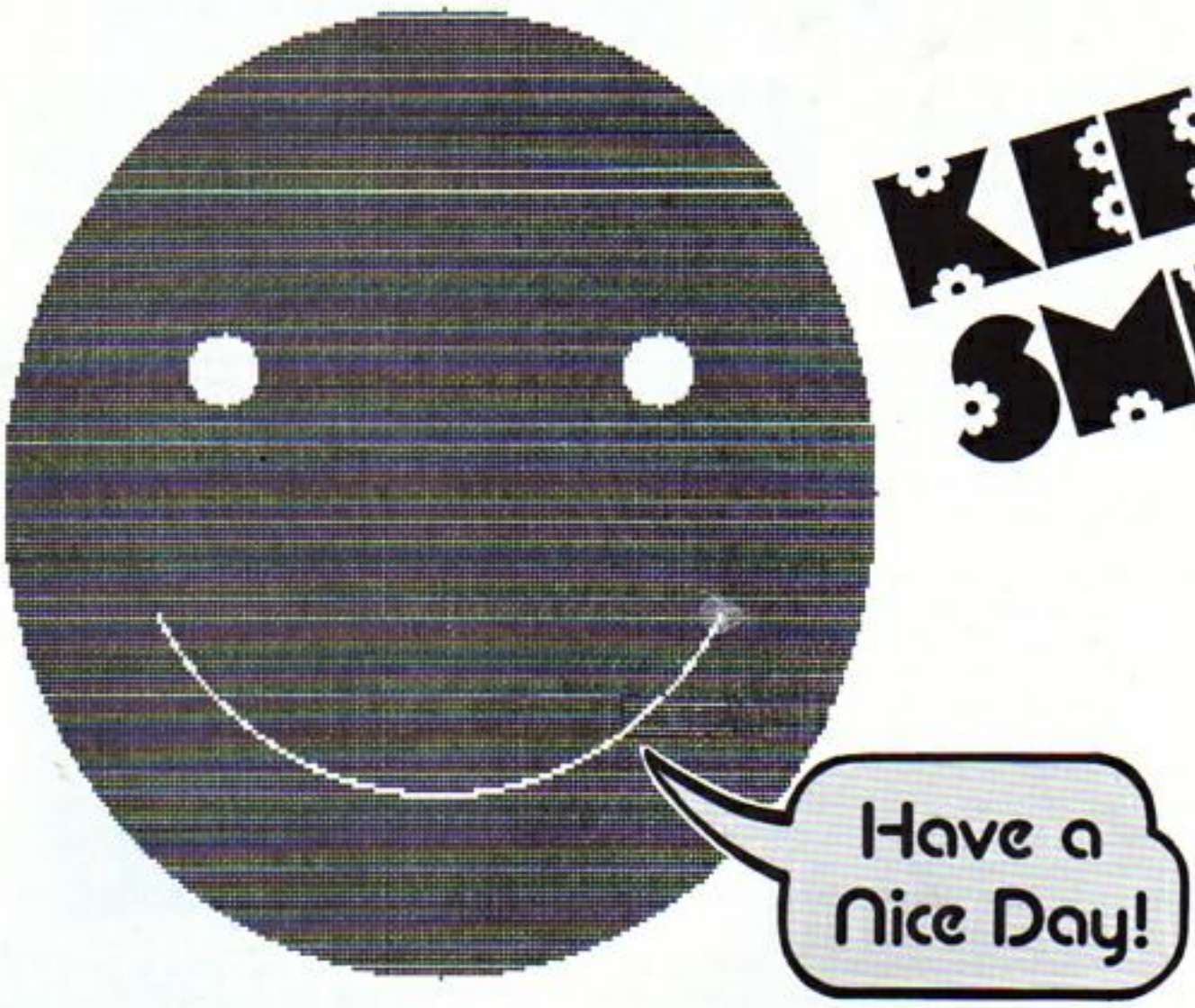
On the minus side, the game is in black and white, and I found the music in between the games a bit tedious.

You can't turn it off without BREAKing the program. If you want 10 minutes peace and quiet you have to reload the game before restarting.

But don't let that put you off. It is a game well worth buying.

Adam Young

Electron User index of software reviews



KEEP ON SMILING

DRAW that familiar smiling face on the screen and display the message of your choice with Smiler by M. PHILLIPS and A. GOLDEN.

By making repeated use of two procedures this short graphics program draws circles and semicircles of differing sizes at different places on the screen.

Clever timing even makes Smiler appear to wink. If you want a different message, just put it between the inverted commas of line 160.

10-30 REM statements making comments.

40-70 These lines set the screen mode. Text is made to appear in red, the graphics colour set to yellow. The flashing cursor is switched off.

80-150 This is the part of the program that makes repeated use of procedures to make up Smiler's face.

160-180 Puts up the message and make the program loop to prevent the cursor re-appearing.

190-280 Lines defining PROCCIRCLE, which is used to draw circles of differing sizes representing the faces and eyes. The X and Y parameters are the graphics coordinates which position the circle. Its radius is controlled by R while its colour is yellow if D is equal to 5 and black if it's equal to 7.

290-380 The procedure which draws the semicircles for the smile.

390-470 Draws a circle from the bottom to the top of the left eye, producing the wink.

480-500 As you might guess, this is a procedure that causes a delay.

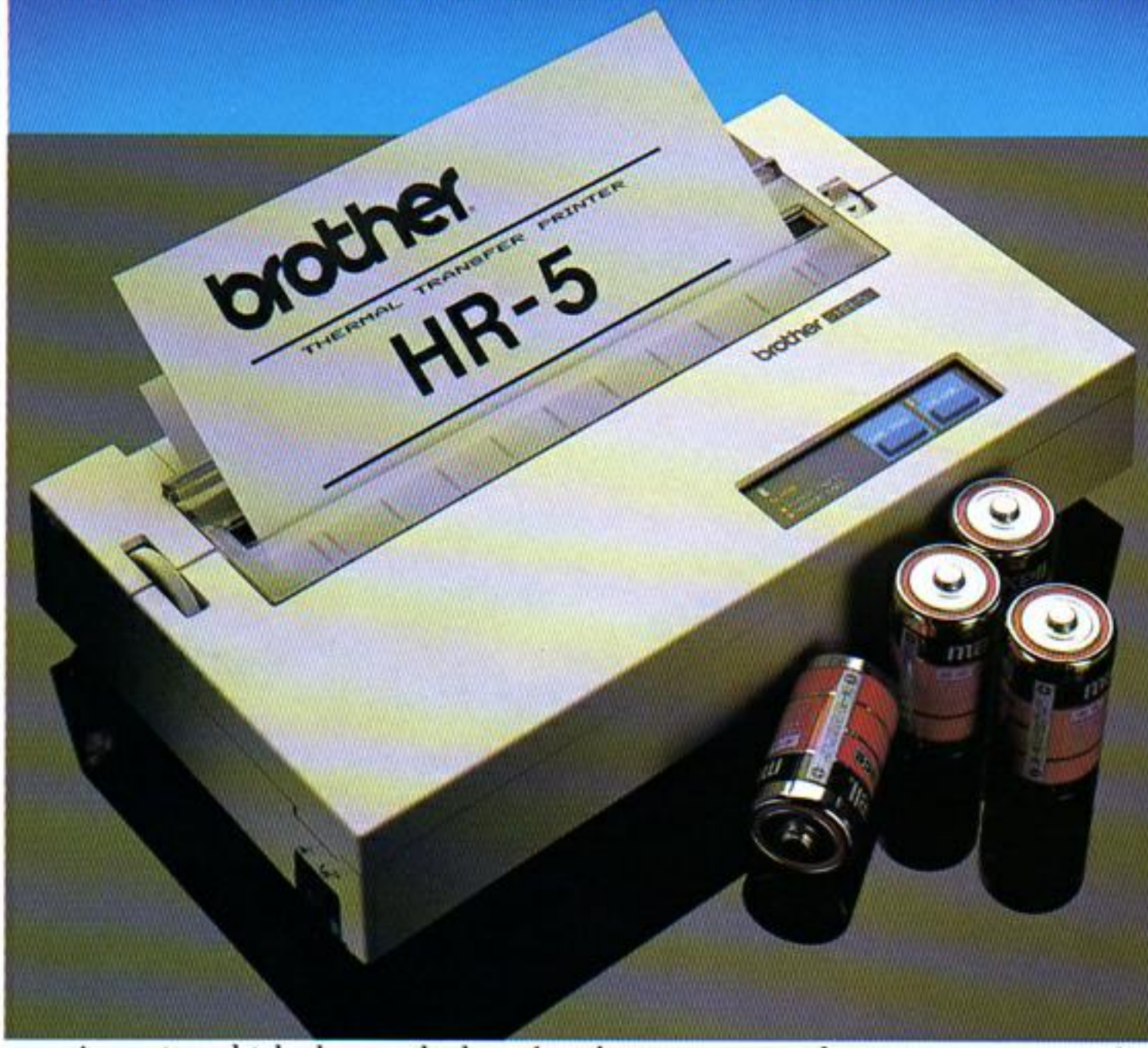
```
10 REM FUN WITH CIRCLES
20 REM BY M PHILLIPS &
    A GOLDEN
30 REM (C)ELECTRON USER
40 MODE 1
50 COLOUR 1
60 GCOL 0,2
70 VDU 23,1,0;0;0;0;0
80 PROCCIRCLE(600,550,400
    ,5)
90 PROCSEMI(600,600,300
    ,7)
100 PROCSEMI(600,600,297
    ,5)
110 PROCCIRCLE(400,650,30
    ,7)
120 PROCCIRCLE(800,650,30
    ,7)
130 PROCDELAY
140 PROCCIRCLE(800,650,30
    ,5)
150 PROCWINK(800,650,30
    ,7)
160 PRINT TAB(24,20);"Have
    a nice day!"
170 REPEAT
    :UNTIL FALSE
180 END
190 DEF PROCCIRCLE(X,Y,R
    ,D)
200 LOCAL I,J
210 FOR I=Y+R TO Y-R
    STEP -4
220 J=SQR (ABS (R*R-(I-Y)*(I-
    Y)))
230 MOVE X-J,I
240 PLOT D,X+J,I
250 SOUND 1,-15,J,1
260 NEXT
270 MOVE X,Y
280 ENDPROC
290 DEF PROCSEMI(X,Y,R,D)
300 LOCAL I,J
310 FOR I=(Y+R)/2 TO Y-R
    STEP -4
320 J=SQR (ABS (R*R-(I-Y)*(I-
    Y)))
330 MOVE X-J,I
340 PLOT D,X+J,I
350 SOUND 1,-15,I,1
360 NEXT
370 MOVE X,Y
380 ENDPROC
390 DEF PROCWINK(X,Y,R,D)

400 LOCAL I,J
410 FOR I=Y-R TO Y+R
    STEP 4
420 J=SQR (ABS (R*R-(I-Y)*(I-
    Y)))
430 MOVE X-J,I
440 PLOT D,X+J,I
450 NEXT
460 MOVE X,Y
470 ENDPROC
480 DEF PROCDELAY
490 TX=TIME
    :REPEAT
    :UNTIL TX+300=TIME
500 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47

Casting Agency

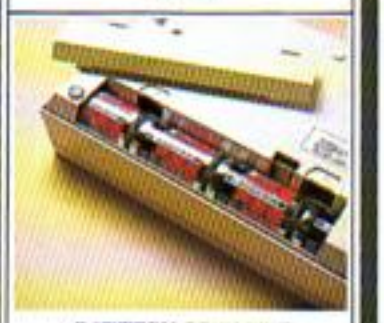

HAVE you a favourite character you would like to see in this monthly feature in Electron User?
Send your drawing of the character, together with the VDU23 statement, to: Shape Dictionary, Electron User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
RACING CAR
From Michael Collins (Brighton)
VDU 23,224,62,62,62,8,
21,127,199,127
VDU 23,225,0,0,255,255,
255,255,252,254
VDU 23,226,3,3,251,248,
253,255,31,15
VDU 23,227,224,224,224,
128,64,254,255,255
VDU 23,228,127,199,127,
21,8,62,62,62
VDU 23,229,254,252,255,255,
255,255,0,0
VDU 23,230,15,31,255,253,
248,251,3,3
VDU 23,231,255,255,254,
64,128,224,224,224
PLANE
From Michael Collins (Brighton)
VDU 23,236,0,12,18,
255,255,3,1,0
VDU 23,237,1,115,231,255,
255,224,224,224

Little Brothers should be seen but not heard.



REGULAR, CONDENSED, OR EXTENDED FACES.

CUT SHEET A4 OR ROLLER PAPER.



BATTERY OR MAINS OPERATED.

A maxim which eloquently describes the Brother HR-5.

Less than a foot across, it's nonetheless loaded with features.

But there's one thing the HR-5 won't give you.

Earache.

For the annoying 'clickety clack' many printers produce is mercifully absent from the HR-5.

Quietly efficient, it delivers high definition dot matrix text over 80 columns at 30 c.p.s.

The HR-5 also has something of an artistic bent.

Being capable of producing uni-directional graph and chart images together with bi-directional text.

It will also hone down characters into a condensed face, or extend them for added emphasis.

Incorporating either a Centronics parallel or RS-232C interface, the HR-5 is compatible with most home computers and popular software.

Perfectly portable, the battery or mains operated HR-5 weighs less than 4lbs, and has a starting price of only £179.95 (inc.VAT).

Which is really something to shout about.

PLEASE SEND ME MORE DETAILS OF THE REMARKABLE BROTHER HR-5 PRINTER.

NAME_____

ADDRESS_____

_____

_____

_____ TEL.NO._____

brother

DEPT P, BROTHER OFFICE EQUIPMENT DIVISION, JONES + BROTHER, SHEPLEY STREET, GUIDE BRIDGE, AUDENSHAW, MANCHESTER M34 5JD
TEL:061 330 6531 (10 LINES) 061 330 0111 (6 LINES) 061 330 3036 (4 LINES). TELEX: 669092. BROTHER INDUSTRIES LTD., NAGOYA, JAPAN.

There's just a ghost of a chance you'll manage to whip round ROLAND WADDILOVE's Money Maze without getting caught . . .

MAKE MINE MONEY AND RUN

RUN through the maze, picking up as many coins as you can, but watch out for the three ghosts who will try to eat you!

If you manage to collect all the coins then the maze is filled again and the ghosts move faster.

Use the following keys to move:

A = up
Z = down
< = left
> = right.

Press the space bar to start. Make sure the Caps Lock light is on.

Full listing starts on Page 57

PROCEDURES

1670 PROCinitialise Defines the characters and the envelopes. Sets up the arrays, switches off the cursor keys and the Escape key. Speeds up the auto repeat.

230 PROCinstructions Prints a few notes about the program.

1240 PROCdraw_maze Draws the maze, looks at each character printed and selects the appropriate colour.

1520 PROCset_variables Sets the starting positions and initial delays for the man and ghosts.

1080 PROCstart Prints the man and ghosts. Sets the delay for the man and ghosts. Selects the colour for the maze.

380 PROCmove_man Only if there is not a wall in the way. Checks if he has run into a ghost. Checks if he has picked up a coin. If it was the last one, calls PROCstart to start a new screen.

580 PROCmove_ghosts If sufficient time has elapsed then moves the ghost by passing the parameters to PROCghost.

640 PROCghost Finds out which way to move. Moves only if there is not a wall in the way. Checks to see if the man has been caught.

750 PROCanother_game Makes a sound. Flashes GOT YOU at the bottom. If the score is the best so far then calls PROChi_score. Asks if you want to play again.

970 PROChi_score Allows you to type in your name.

1970 PROCtidy_up Restores the auto-repeat, cursor keys, and Escape key.

VARIABLES

maze$( ) Stores each row of the maze.

ghost%( ) Stores the ghost positions – x,y,x,y,x,y for the three ghosts.

gtime%( ) The ghost is moved when gtime%( ) is less than TIME.

gdelay%( ) The delay before each ghost is moved.

best% Best score so far.

mtime% When TIME is greater than mtime% the man can be moved.

mdelay% The delay before the man can be moved.

manx%, many% The man's x,y coordinates.

newx%, newy% Temporary x,y coordinates for the man or ghost.

score% Score.

caught Whether the man has been caught or not.

n%, i General variables, used in loops.

IMPROVEMENTS/MODIFICATIONS

mdelay%, gdelay% Alter these to change the speed of the game – the smaller they are the faster the initial speed. These decrease with each new maze. Alter the step with which they decrease each time.

No need to tax your brain over prices. Just use this program to . . .

ADD VAT

THIS simple but useful program from SIMON JAMES of Workington, Cumbria works out the VAT price for an item.

As Simon says: "I have used this program to help my father check the VAT prices in our family menswear shops. He still insists he can do it better in his head . . . so much for the computer age".

Can you work them out faster than the Electron? Why not try it and see?

```
10 REM V.A.T PROGRAM
20 P%=15
30 F%=100
40 MODE 2
45 VDU 23,1,0;0;0;0;
50 COLOUR 0
60 COLOUR 129
65 CLS
70 PRINT TAB(5,4);"HELLO"
80 PRINT '''"I am here
   to assist you."
90 COLOUR 2
   :PRINT "What is your
   name"
100 INPUT N$
110 COLOUR 0
   :PRINT '"Hello ";N$;
   " pleased to"'"meet
   you."
120 PRINT '"Type in your
   figure when I play
   the"'"note."
130 FOR v=0 TO 1000
      :NEXT
140 SOUND 1,-15,78,5
160 INPUT ''"TYPE IN YOUR
      NUMBER"N
170 IF N<0 OR N>1000
      THEN GOTO 160
180 X=N*P%/F%+N
190 PRINT '''"The V.A.T
      price for this item
      is ";X
200 PRINT ''"Any more items
    ?"
220 INPUT "Press 'T'"R$
230 IF R$="T"
    THEN CLS
    :GOTO 160
    ELSE STOP
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

crystals to create and rotate

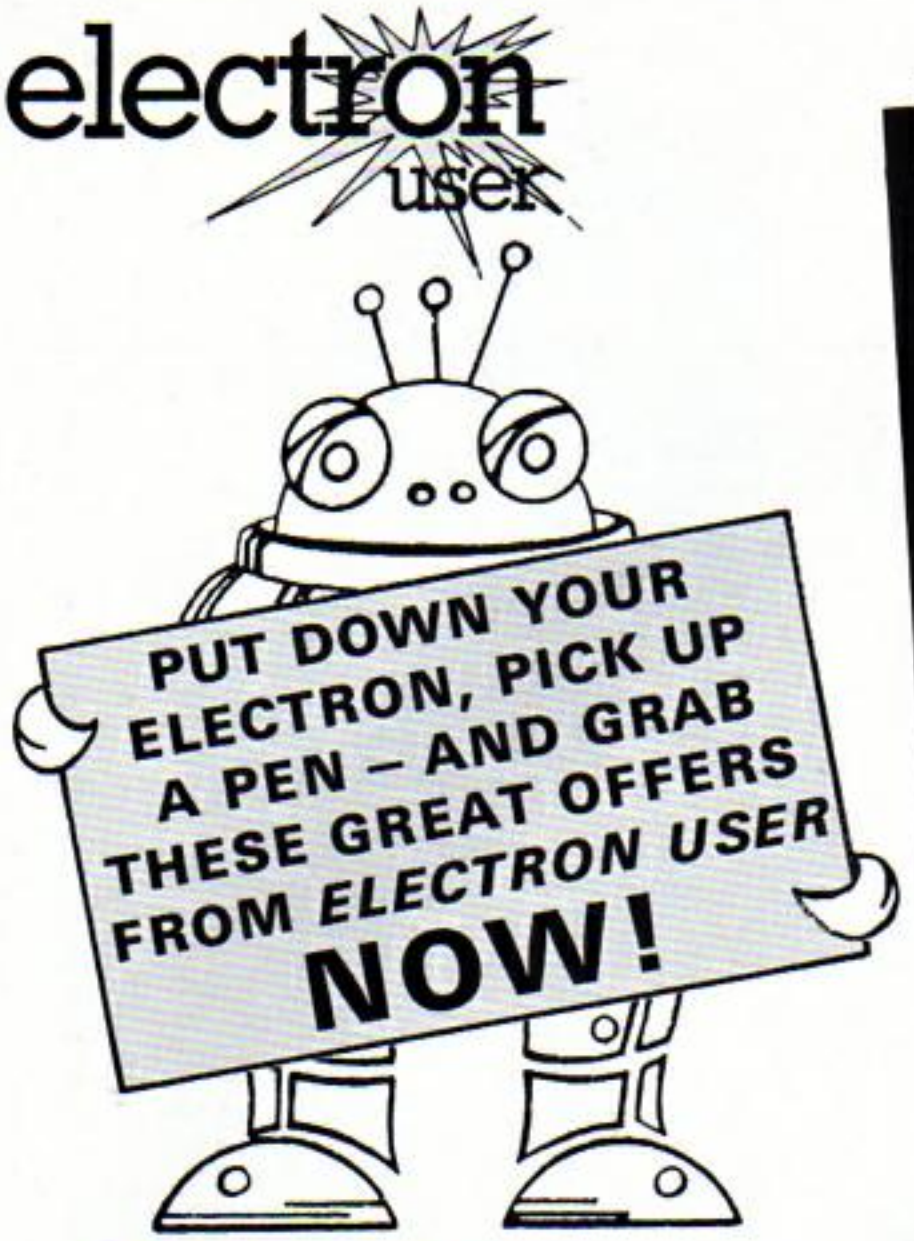
CRYSTALS, from DAVID DAVIES of West Glamorgan, is a graphics program that draws five multi-coloured crystals on the screen.

When all five have been drawn the colours change in such a way as to make the crystals appear to rotate.

```
10 REM ****CRYSTALS
20 REM ****By David Davies
30 REM ****(C) ELECTRON
   USER
40 MODE 2
50 VDU 23,1,0;0;0;0;
60 sizex%=100
   :sizey%=100
70 PROCallcrystals(200
   ,800,100,100)
   :PROCallcrystals(1000
   ,800,100,100)
80 PROCallcrystals(1000
   ,200,100,100)
   :PROCallcrystals(200
   ,200,100,100)
90 PROCallcrystals(600
   ,500,100,100)
100 PROCcolchange
110 END
120 DEF PROCcrystals(posx%
   ,posy%,sizex%,sizey%)
130 FOR N%= 1 TO 7
140 PLOT 4,posx%,posy%
150 X%=sizex%*(N%/7)
   :Y%=sizey%-((N%/7)*sizey%
   )
160 GCOL 0,N%
170 PLOT 1,X%,Y%
180 NEXT N%
190 FOR O%=1 TO 7
200 PLOT 4,posx%,posy%
210 X%=sizex%-((O%/7)*sizex%)
   :Y%=-((O%/7)*(sizey%))
220 GCOL 0,O%
230 PLOT 1,X%,Y%
240 NEXT O%
250 FOR P%=1 TO 7
260 PLOT 4,posx%,posy%
270 X%=-(sizex%*(P%/7))
   :Y%=-(sizey%-((P%/7)*size
   y%))
280 GCOL 0,P%
290 PLOT 1,X%,Y%
300 NEXT P%
310 FOR Q%= 1 TO 7
320 PLOT 4,posx%,posy%
330 X%=-(sizex%-((Q%/7)*sizex
   %))
   :Y%=(Q%/7)*(sizey%)
340 GCOL 0,Q%
350 PLOT 1,X%,Y%
360 NEXT Q%
370 ENDPROC
380 DEF PROCfourcrystals
390 PROCcrystals(posx%-(sizex
   %*1.5),posy%,sizex%/2
   ,sizey%/2)
400 PROCcrystals(posx%+(sizex
   %*1.5),posy%,sizex%/2
   ,sizey%/2)
410 PROCcrystals(posx%,posy%+
   (sizey%*1.5),sizex%/2
   ,sizey%/2)
420 PROCcrystals(posx%,posy%-
   (sizey%*1.5),sizex%/2
   ,sizey%/2)
430 ENDPROC
440 DEF PROCcolchange
450 FOR col2%=1 TO 7
460 FOR col%=1 TO 7
470 col3%=col%+col2%
480 IF col3%>7
   THEN col3%=col3%-7
490 VDU 19,col%,col3%,0
   ,0,0
500 NEXT col%
510 time%=INKEY (20)
520 NEXT col2%
530 GOTO 450
540 ENDPROC
550 DEF PROCallcrystals(posx%
   ,posy%,sizex%,sixey%)

560 PROCcrystals(posx%,posy%
   ,sizex%,sixey%)
570 PROCfourcrystals
580 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

electron user



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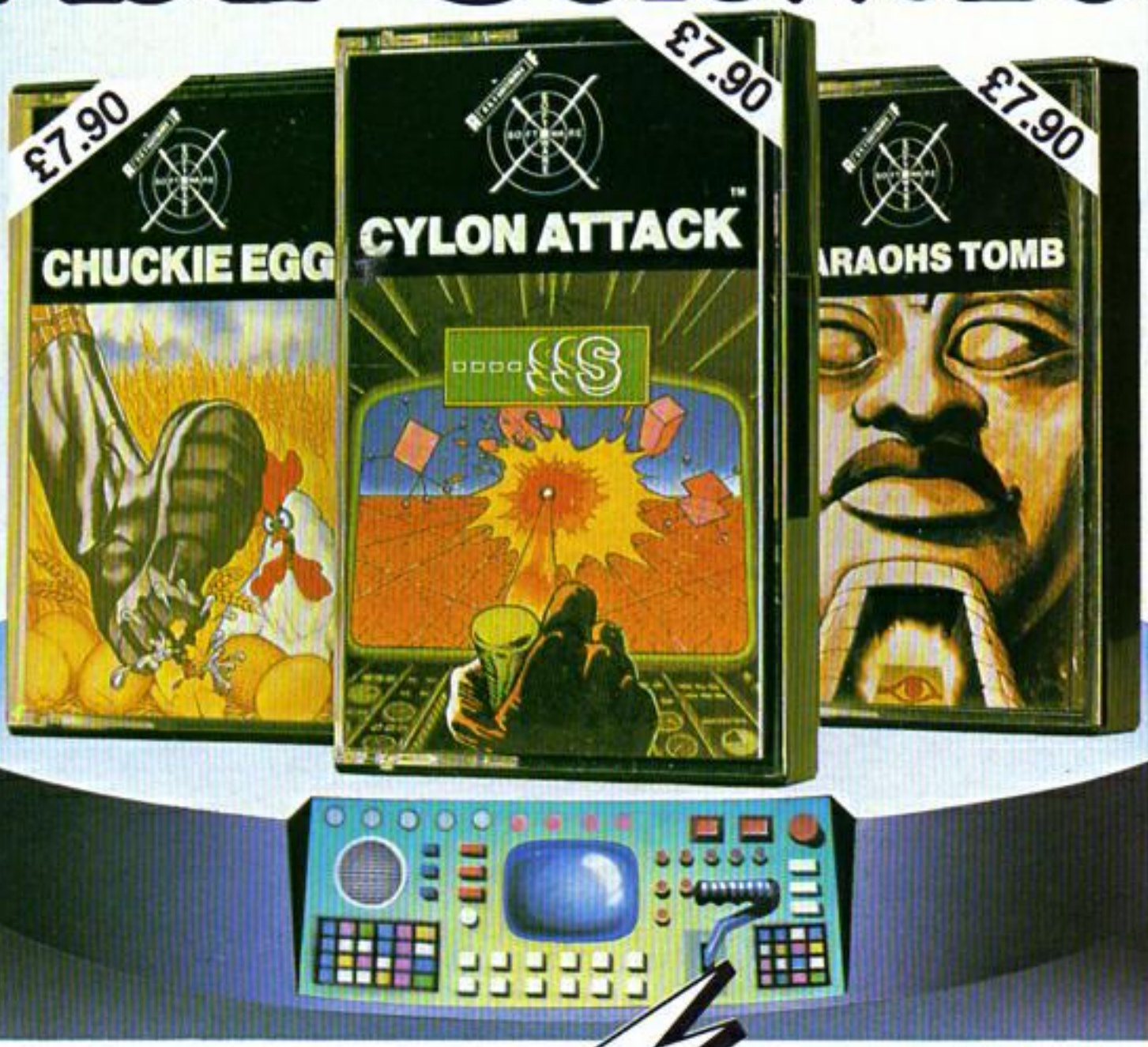

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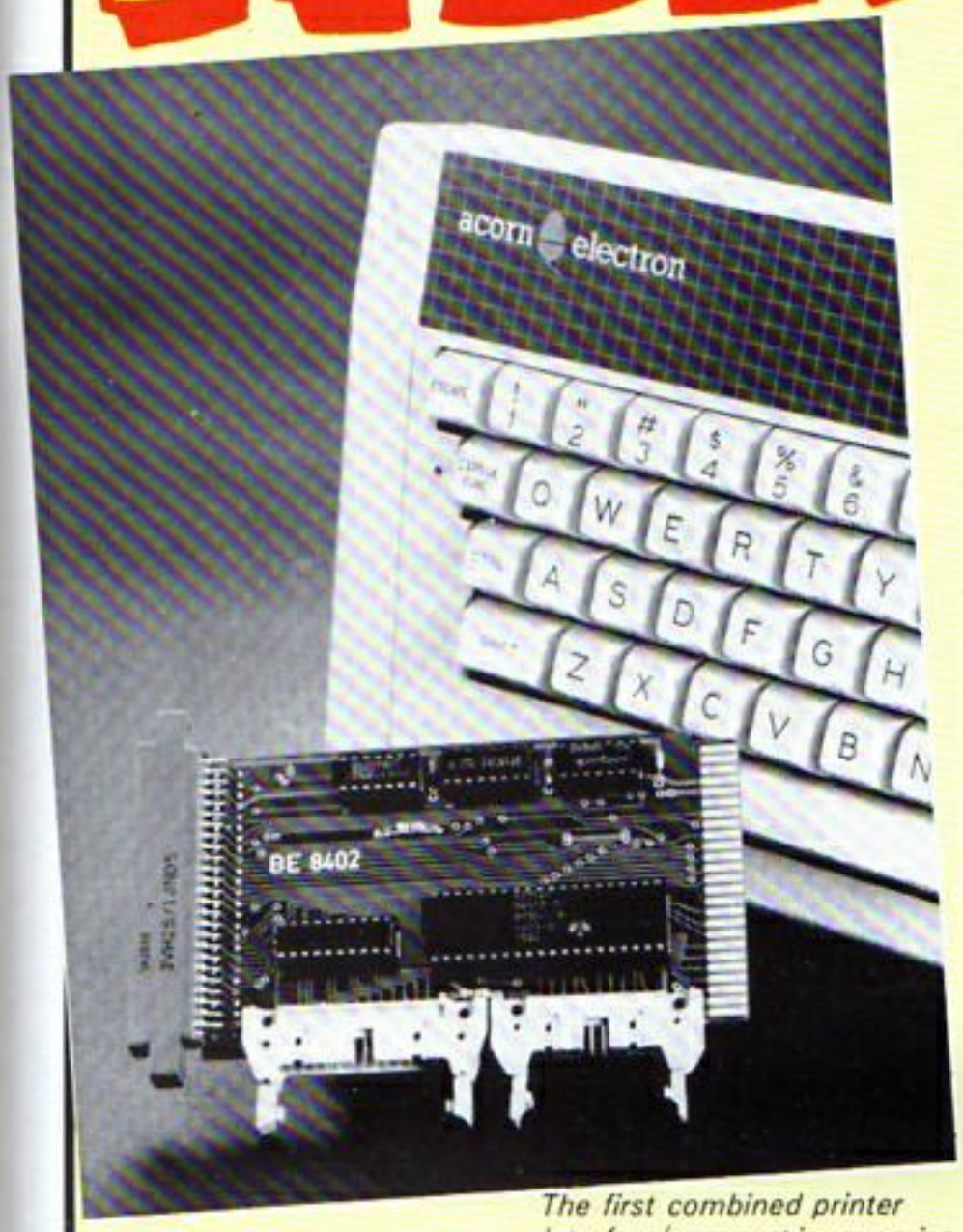

The first combined printer interface/user port is your prize in this month's competition

HAVE you ever had one of those days when everything seems to go wrong? Well here at *Electron User* we seem to have had a bit of midsummer madness.

We were sorting through some of our old tapes, seeing what was on them, when we came across the following:

```
10 REM 3D-PLOT
20 REM RIPPED OFF FROM
30 P."Dear Santa,"
40 DIM XPOS%(9),YPOS%(9)
50 *FX202,48
60 M%=1
   :C%=3
70 PROCWHICH(SIDE(0))
80 REM *** READ X CO-ORDINAT
   ES ***
```

Weird, isn't it? As far as we can tell, each line is correct but they're all from a different program, each program from one of our first eight issues.

Somehow the separate lines from separate magazines have combined to form one program.

Figure out where these program lines came from and you could be on to a winner!

Can you figure out from which programs in which issues the lines came?

If you can, you could win Broadway Electronics' new combined printer interface and user port.

All you have to do is discover which programs the lines originally appeared in. Next pop down the numbers of the pages they appear on.

Then tell us the feature you would most like to see in a future issue of *Electron User* and send it all to us.

Entries must be received by June 30, 1984, and the judges' decision will be final.

WE HAVE A WINNER

Remember in the March competition we asked you to tell us which of a set of nine variable names were incorrect?

The response was fantastic, most people realising that all you had to do was type the names into the Electron and it would throw out the bad ones.

The winner of the 10 Program Power cassettes is F.J. Lancaster of Cuckfield, Sussex.

Not only did he get the variable names right, but he had what in the judges' opinion the best reason for being an Electron user:

"I'm an Electron user because I am a collector of rare editions".

Electron User contest entry form

Issue	Page
1	☐
2	☐
3	☐
4	☐
5	☐
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Finish the following sentence using not more than 20 words:

The feature I would most like to see in *Electron User* is:

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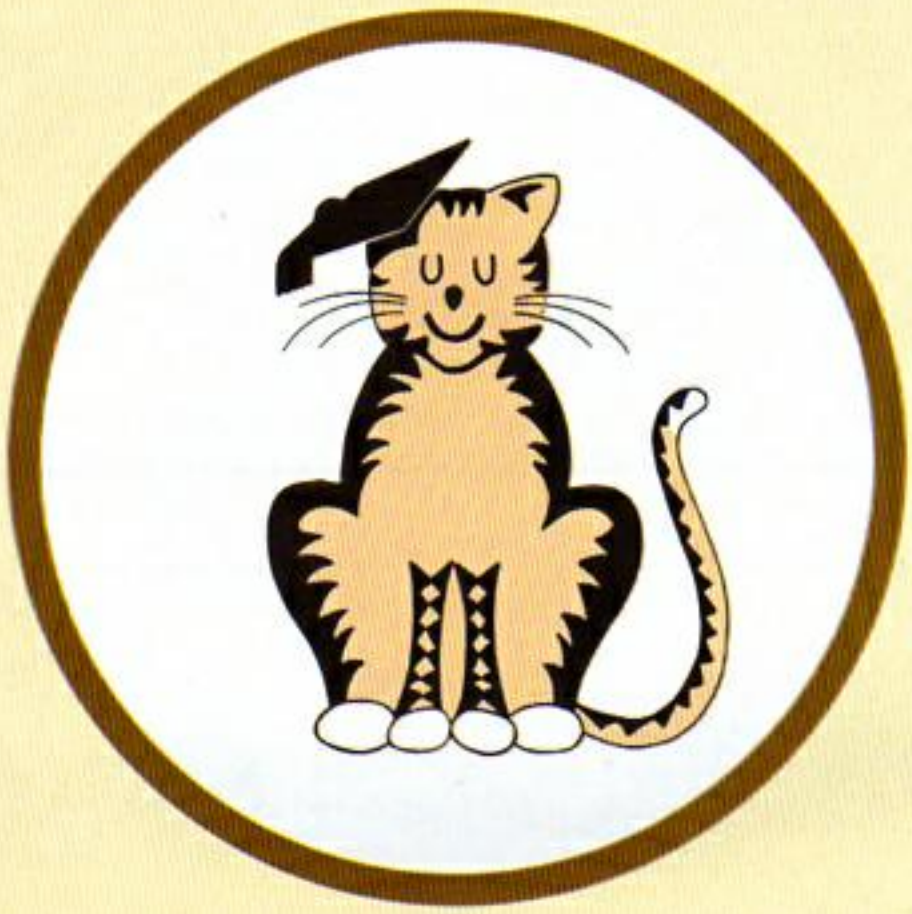

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MIKE BIBBY'S

MATHS workout

Exercises for the Electron

AS we have mentioned in previous articles, the Electron – and all other machines based on the 6502 microprocessor – handles its binary numbers in groups of eight bits at a time. Such a group of eight is called a byte.

However, while handling eight bits at a time is satisfactory from the machine's point of view, from the human side of things it's rather difficult to manage.

Those 1s and 0s are far too prone to error. Look at Table I for instance. It contains an error – can you find it?

It's all too easy to slip up when handling binary numbers – a single 1 in the wrong place and all is lost!

To make things easier to deal with, when I am copying out binary numbers I put a wavy line between bits 3 and 4

%10111011 = 187
%10101101 = 173
%10001111 = 151
%11110110 = 246

Table I

to split the byte into two equal groups of four.

For example, if I were copying:

% 10001111(= 1 4 3)

I would write:

% 1000 ~1111

Actually, splitting the byte into two groups of four bits is standard practice – each group of four bits is called a "nibble", would you believe.

It's not too hard to see that the biggest number you can represent in a nibble is 15, and the smallest is 0,

%1111 and **% 0000**

respectively. After all, you've only got four bits to play with!

So we can split up our byte into two nibbles of four bits each.

Now when we split up a binary number in this manner we call the "left-hand" nibble the most significant nibble (MSN) and the "right hand nibble" the least significant nibble (LSN).

We have already created one new number system – the binary system.

Let's design another one that combines the advantages of the denary system with those of the binary.

That is, it will be easy to read and write, yet will still allow us to perceive the binary manner in which the machine handles things.

The system we want is called hexadecimal.

This consists of using our standard digits 0 to 9 for the number zero to nine respectively, and the letter A to F for the numbers 10 to 15.

In this way it allows us to code the numbers available in a nibble (that is, 0 to 15) with just one digit. This digit will be in the range 0 to 9 or A to F.

It may take a while to adjust to the idea of using letters of the alphabet for numbers, but it soon becomes second nature.

You just have to get used to counting:

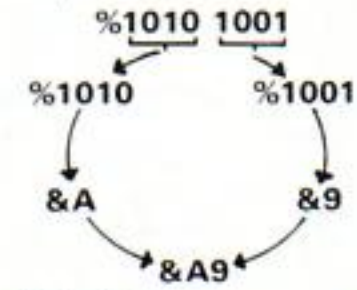
1,2,3,4,5,6,7,8,9,
A,B,C,D,E,F

Remember, there are B people in a cricket team, D in a rugby league team and F in a rugby union team. There are C months in a year, and E days in a fortnight.

Now just as we prefix all our binary numbers with %, we prefix our hexadecimal numbers with &, to avoid confusion. So &F means 15, while &9 means 9.

Studying Table II will really pay dividends – I suggest you practise writing down bit patterns of nibbles and their hexadecimal equivalents until it becomes second nature.

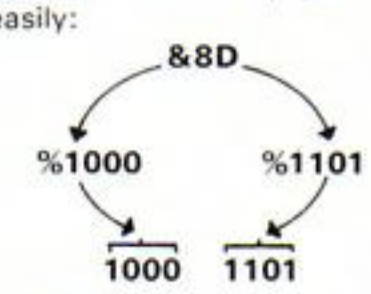
Given that we can encode a nibble in one hexadecimal digit, and that a byte consists of two nibbles, it should readily be apparent that we can encode a byte as two hexadecimal digits side by side, for example:



That is:
%10101001 = &A9 = 169

You just split the byte up into two nibbles – a left hand and a right hand nibble, encode each as a hexadecimal number, then put the two side by side.

You can go from hexadecimal to binary just as easily:



That is:
&8D = % 10001101 = 141

Although you have probably never thought of it in these terms, you are well aware that the value a digit represents depends on the column it is in.

The number 230 is not as large as 320, though both numbers contain the same digits.

In hexadecimal coding too the column a digit is in is important.

For example, &10 is far greater than &01. In binary each column is worth twice the preceding one.

In denary, our usual number system, each column is worth 10 times the preceding one.

In hexadecimal, each column is worth 16 times the preceding one.

Believe or not, the columns in a four digit hexadecimal number, from greatest to least, are worth **4096, 256, 16** and **1** respectively.

This means that:

&1101 = 4096 + 256 + 1 = 4353

For the moment let's concentrate on the two digit – that is, two column – hexadecimal number, as these are all we need to store our bytes in.

In this case the left-hand

column is the "sixteens" column, the right hand the units column.

So:

```
  16  1
& 2  1 =   2*16+1 = 33
  16  1
& 2  D =   2*16+13 = 45
  16  1
& 8  0 =   8*16+0 = 128
  16  1
& C  0 = 12*16+0 = 192
```

To translate a two digit hexadecimal number into denary simply multiply the number in the left-hand column by 16 and add it to the number in the right-hand column – remembering to translate A to F if necessary.

The second column has the value 16 since the first column can only handle numbers up to 15 (&F) – the largest you can fit into a nibble (%1111).

After 15, you *have* to use a second column for 16 – that is &10.

Just as in denary, we "carry" at 10 since the largest value our columns can handle is 9, so in hexadecimal we carry at 16, since the largest value our columns can handle is 15 (&F).

It is the fact that we carry at 16 that gives this number system its name "hexa-decimal". Here "hex" stands for 6, "decimal" for ten. "Hexadecimal" = 6 + 10 = 16.

Given a second column, &10, as we have seen is 16, 17 will be &11, while &12 is 18 and so on until we reach 31, which is &1F.

We have then run out off legal digits for the units column. So if we want to go on to 32 we had better give ourselves another 16, and set the units column back to zero, that is &20.

Another way of looking at the second column is that it comes from the most significant nibble.

To turn the least significant nibble into the most significant nibble we have to shift it over to the left four times.

If you cast your mind back to last month, this is equivalent to multiplying it by two four times in succession. That is:

2×2×2×2=16

This is why a hexadecimal digit representing the most significant nibble is 16 times larger than the same digit representing the least significant nibble.

The largest number you can store in a two-digit hexa-decimal number is &FF = 15×16+15=255.

This is, of course, the same as the largest number we could store in a binary byte. We often refer to a two digit hexadecimal number simply as a byte.

To obtain the hexadecimal equivalent of a positive inter-ger (whole number) less than 256, we divide it by 16.

The quotient is the left hand digit, the remainder the right hand, translating into A to F where necessary.

For example:

174÷16=10 r 14

That is:

& A r & E

Hence **174=& AE**

Fortunately we don't have to go to such lengths. The Electron allows us to simply print out the hexadecimal equivalent of decimal numbers and vice versa.

For instance:

P. &BC will give
192
while **P.~141** will give
&8D

Decimal	*Binary*	*Hexa-decimal*
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

Table II

Money Maze listing

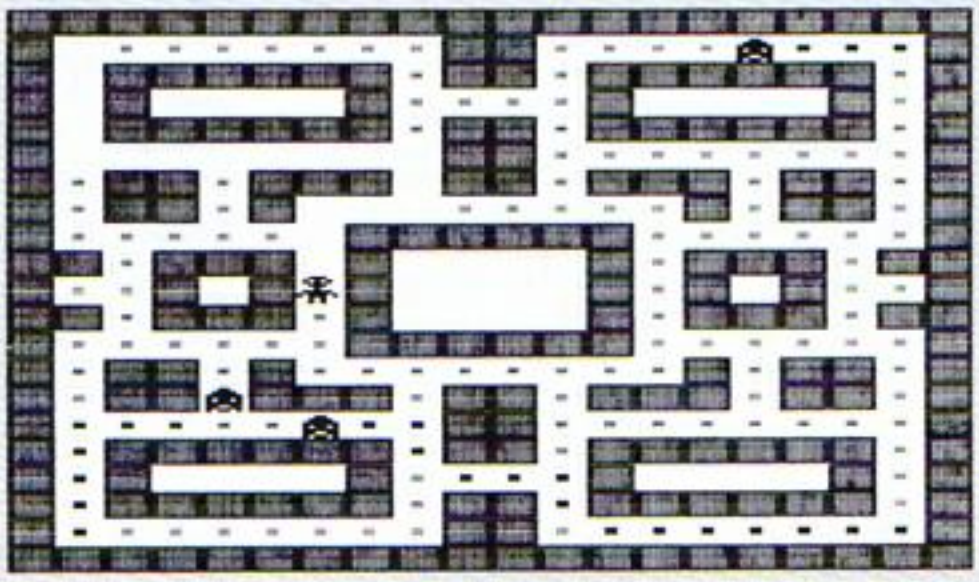
From Page 43

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are given on Page 4 of the February issue.

```
10 REM ** Money Maze **
20 REM ** By R.A.Waddilove
   **
30
40 PROCinitialise
50 MODE 1
60 PROCinstructions
70 MODE 5
80 VDU 23,1,0;0;0;0;
90 REPEAT
100 PROCdraw_maze
110 PROCset_variables
120 PROCstart
130 REPEAT
140 PROCmove_man
150 PROCmove_ghosts
160 UNTIL caught
170 PROCanother_game
180 UNTIL key$="N"
190 MODE 6
200 PROCtidy_up
210 END
220
230 DEF PROCinstructions
240 PRINT 'TAB(13);"MONEY
    - MAZE"
250 PRINT TAB(12);"----------
    ----"
260 COLOUR 2
270 PRINT '"Run around the
    maze picking up as many"
    '"coins as you can ,
    but watch out for the"'
    "three ghosts who will
    try to eat you !"
280 PRINT '"If you manage
    to collect all the coins
    "'"then the maze is
    filled again and the"'
    "ghosts move faster."
290 PRINT '"Use the followin
    g keys to move:-"
300 PRINT '" A=up      Z=down
        <=left      >=right"
310 COLOUR 1
320 PRINT '''TAB(4);"Press
    the space bar to start..
    ."
330 PRINT '''"(Make sure
    CAPS LOCK [the light]
    is on)"
340 REPEAT
350 UNTIL GET$ =" "
360 ENDPROC
370
380 DEF PROCmove_man
390 IF TIME <mtime%
    THEN ENDPROC
400 mtime%=mtime%+mdelay%
410 key=INKEY 0
420 *FX15,1
430 newx%=manx%-(key=46)+(key
    =44)
440 newy%=many%+(key=65)-(key
    =90)
450 char$=MID$(maze$(newy%)
    ,newx%+1,1)
460 IF char$=CHR$ 227
    THEN ENDPROC
470 PRINT TAB(manx%,many%);
    " ";TAB(newx%,newy%);
    CHR$ 225
480 manx%=newx%
    : many%=newy%
490 IF manx%=ghost%(1)
    AND many%=ghost%(2)
     OR manx%=ghost%(3)
     AND many%=ghost%(4)
     OR manx%=ghost%(5)
     AND many%=ghost%(6)
    THEN caught=TRUE
500 IF char$<>CHR$ 226
    THEN ENDPROC
510 SOUND &11,-15,100,1
520 score%=score%+10
530 PRINT TAB(12,24);score%
540 IF score% MOD 1660=0

    THEN PROCdraw_maze
    : PROCstart
550 maze$(many%)=LEFT$(maze$(
    many%),manx%)+" "+
    MID$(maze$(many%),manx%+2)
560 ENDPROC
570
580 DEF PROCmove_ghosts
590 IF TIME >gtime%(1)
    THEN PROCghost(1,ghost%(1
    ),ghost%(2))
    : ghost%(1)=newx%
    : ghost%(2)=newy%
600 IF TIME >gtime%(2)
    THEN PROCghost(2,ghost%(3
    ),ghost%(4))
    : ghost%(3)=newx%
    : ghost%(4)=newy%
610 IF TIME >gtime%(3)
    THEN PROCghost(3,ghost%(5
    ),ghost%(6))
    : ghost%(5)=newx%
    : ghost%(6)=newy%
620 ENDPROC
630
640 DEF PROCghost(n%,ghostx%
    ,ghosty%)
650 gtime%(n%)=gtime%(n%)+gde
    lay%(n%)
660 newx%=ghostx%+SGN (manx%-
    ghostx%)
670 IF MID$(maze$(ghosty%)
    ,newx%+1,1)=CHR$ 227
    THEN newx%=ghostx%
680 newy%=ghosty%+SGN (many%-
    ghosty%)
690 IF MID$(maze$(newy%)
    ,newx%+1,1)=CHR$ 227

    THEN newy%=ghosty%
700 PRINT TAB(ghostx%,ghosty%
    );MID$(maze$(ghosty%)
    ,ghostx%+1,1);TAB(newx%
    ,newy%);CHR$ 224
710 IF newx%=manx% AND newy%=
    many%
    THEN caught=TRUE
720 SOUND &11,n%,1,2
730 ENDPROC
740
750 DEF PROCanother_game
760 SOUND 1,4,0,60
    : SOUND 1,5,200,60
770 FOR i=0 TO 36
780 COLOUR i MOD 4
790 PRINT TAB(2,27);"**
     GOT  YOU  **"
800 TIME =0
810 REPEAT UNTIL TIME >10
820 NEXT i
830 PROCpause(300)
840 COLOUR 2
850 IF score%>best%
    THEN PROChi_score
860 PRINT TAB(0,27);"Best
     score:";best%;SPC (10)
870 PRINT "By ";name$
880 SOUND 1,-15,100,5
890 PROCpause(500)
900 SOUND &11,-15,100,10
910 PRINT TAB(0,27);"Do you
     want to play"'"  again
     ? (Y or N)"
920 REPEAT key$=GET$
930 UNTIL key$="Y" OR key$=
    "N"
940 CLS
950 ENDPROC
960
970 DEF PROChi_score
980 *FX15,1
990 *FX11,0
```



Money Maze listing

From Page 57

```
1000 best%=score%
1010 SOUND 1,-15,100,5
1020 PRINT TAB(0,27);"Best
     score so far !"'
1030 PROCpause(200)
1040 PRINT TAB(0,27);"What
     is your name ?"'
1050 INPUT name$
1060 ENDPROC
1070
1080 DEF PROCstart
1090 PRINT TAB(manx%,many%);
     CHR$ 225;TAB(ghost%(1)
     ,ghost%(2));CHR$ 224;
     TAB(ghost%(3),ghost%(4));
     CHR$ 224;TAB(ghost%(5)
     ,ghost%(6));CHR$ 224
1100 maze$(many%)=LEFT$(maze$(
     many%),manx%)+" "+
     MID$(maze$(many%),manx%+2)
1110 score%=score%+10
1120 mdelay%=mdelay%-2
1130 gdelay%(1)=gdelay%(1)-10
1140 gdelay%(2)=gdelay%(2)-20
1150 gdelay%(3)=gdelay%(3)-40
1160 gtime%(1)=TIME +gdelay%(1)
1170 gtime%(2)=TIME +gdelay%(2)
1180 gtime%(3)=TIME +gdelay%(3)
1190 i=score% DIV 1660 +
     1
1200 VDU 19,1,VAL MID$("134212
     35",i,1),0,0,0
1210 VDU 19,2,VAL MID$("316356
     26",i,1),0,0,0
1220 ENDPROC
1230
1240 DEF PROCdraw_maze
1250 maze$(1)=STRING$(20
     ,CHR$ 227)
1260 maze$(2)=CHR$ 227+
     STRING$(8,CHR$ 226)+
     CHR$ 227+CHR$ 227+
     STRING$(8,CHR$ 226)+
     CHR$ 227
1270 maze$(3)=CHR$ 227+
     CHR$ 226+STRING$(6,
     CHR$ 227)+CHR$ 226+
     CHR$ 227+CHR$ 227+
     CHR$ 226+STRING$(6,
     CHR$ 227)+CHR$ 226+
     CHR$ 227
1280 maze$(4)=CHR$ 227+
     CHR$ 226+CHR$ 227+"
        "+CHR$ 227+CHR$ 226+
     CHR$ 226+CHR$ 226+
     CHR$ 226+CHR$ 227+"
        "+CHR$ 227+CHR$ 226+
     CHR$ 227
1290 maze$(5)=maze$(3)
1300 maze$(6)=maze$(2)
1310 maze$(7)=CHR$ 227+
     CHR$ 226+CHR$ 227+
     CHR$ 227+CHR$ 226+
     CHR$ 227+CHR$ 227+
     CHR$ 227+CHR$ 226+
     CHR$ 227+CHR$ 227+
     CHR$ 226+CHR$ 227+
     CHR$ 227+CHR$ 227+
     CHR$ 226+CHR$ 227+
     CHR$ 227+CHR$ 226+
     CHR$ 227
1320 maze$(8)=CHR$ 227+
     CHR$ 226+CHR$ 227+
     CHR$ 227+CHR$ 226+
     CHR$ 227+STRING$(8,
     CHR$ 226)+CHR$ 227+
     CHR$ 226+CHR$ 227+
     CHR$ 227+CHR$ 226+
     CHR$ 227
1330 maze$(9)=CHR$ 227+
     STRING$(6,CHR$ 226)+
     STRING$(6,CHR$ 227)+
     STRING$(6,CHR$ 226)+
     CHR$ 227
1340 maze$(10)=CHR$ 227+
     CHR$ 227+CHR$ 226+
     CHR$ 227+CHR$ 227+
     CHR$ 227+CHR$ 226+
     CHR$ 227+CHR$ 32+
     CHR$ 32+CHR$ 32+CHR$ 32+
     CHR$ 227+CHR$ 226+
     CHR$ 227+CHR$ 227+
     CHR$ 227+CHR$ 226+
     CHR$ 227+CHR$ 227
1350 maze$(11)=CHR$ 227+
     CHR$ 226+CHR$ 226+
     CHR$ 227+" "+CHR$ 227+
     CHR$ 226+CHR$ 227+"
        "+CHR$ 227+CHR$ 226+
     CHR$ 227+" "+CHR$ 227+
     CHR$ 226+CHR$ 226+
     CHR$ 227
1360 FOR i=1 TO 10
1370 maze$(22-i)=maze$(i)
1380 NEXT i
1390 COLOUR 2
1400 PRINT TAB(0,1);
1410 FOR i=1 TO 21
1420 FOR j=1 TO 20
1430 char$=MID$(maze$(i)
     ,j,1)
1440 IF char$=CHR$ 227
     THEN COLOUR 129
     : COLOUR 2
     ELSE COLOUR 128
     : COLOUR 1
1450 PRINT char$;
1460 NEXT j
1470 NEXT i
1480 COLOUR 3
     : COLOUR 128
1490 PRINT ''TAB(6);"Score=0"
1500 ENDPROC
1510
1520 DEF PROCset_variables
1530 manx%=1
     : many%=2
1540 ghost%(1)=18
     : ghost%(2)=20
1550 ghost%(3)=1
     : ghost%(4)=20
1560 ghost%(5)=18
     : ghost%(6)=2
1570 score%=0
1580 TIME =0
1590 mdelay%=22
     : mtime%=TIME +mdelay%
1600 gdelay%(1)=70
1610 gdelay%(2)=140
1620 gdelay%(3)=280
1630 caught=FALSE
1640 *FX11,5
1650 ENDPROC
1660
1670 DEF PROCinitialise
1680 *KEY10,"OLD !M RUN !M"
1690 REM ** ghost **
1700 VDU 23,224,0,24,60,126
     ,90,126,102,90
1710 REM ** man **
1720 VDU 23,225,56,84,56
     ,16,124,186,40,40
1730 REM ** dot **
1740 VDU 23,226,0,0,0,24
     ,24,0,0,0
1750 REM ** wall **
1760 VDU 23,227,255,129,129
     ,129,129,129,129,255
1770 ENVELOPE 1,1,0,0,0,0
     ,0,0,126,0,0,-126,126
     ,126
1780 ENVELOPE 2,1,8,0,0,1
     ,0,0,126,0,0,-126,126
     ,126
1790 ENVELOPE 3,1,16,0,0
     ,1,0,0,126,0,0,-126
     ,126,126
1800 ENVELOPE 4,1,1,0,0,50
     ,0,0,126,0,0,-126,126
     ,126
1810 ENVELOPE 5,129,-1,0
     ,0,200,0,0,126,0,0,-126
     ,126,126
1820 DIM maze$(21)
1830 DIM ghost%(6)
1840 DIM gtime%(3),gdelay%(3)
1850 best%=0
1860 *FX12,5
1870 *FX4,1
1880 *FX229,1
1890 ENDPROC
1900
1910 DEF PROCpause(delay%)
1920 TIME =0
1930 REPEAT
1940 UNTIL TIME >delay%
1950 ENDPROC
1960
1970 DEF PROCtidy_up
1980 *FX12,0
1990 *FX4,0
2000 *FX229,0
2010 *FX15,1
2020 PRINT ''"Money Maze was
     written by"''"R.A.Waddil
     ove."'
2030 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

SCORBY SOFT
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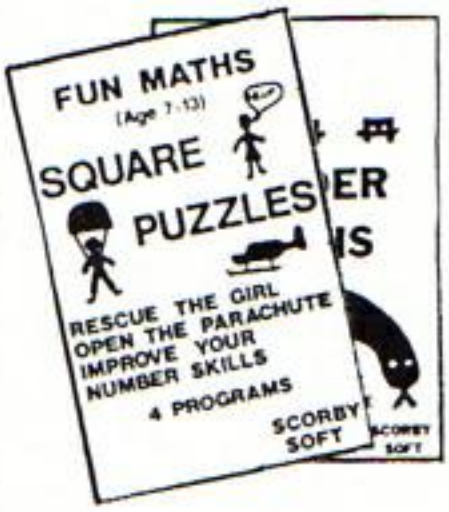

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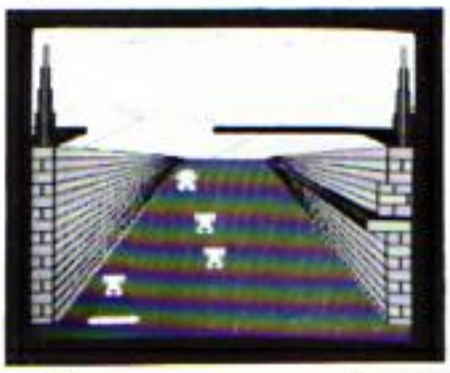
NEW! Lemming Syndrome



Mad Marco is on the rampage and has blown the bridge to the mainland. The panic-stricken population are hurling themselves into the shark infested waters and your job is to bounce them to safety whilst avoiding the marauding sharks and the desperate attempts of Marco to blow up your liferaft. This highly original, fast and furious game is full of special features and options designed to make your task harder as you get better.

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Caught in the capitalistic pursuit of corporate expansion, your ambition is to attain the ultimate accolade – the key to the executive washroom! Avoid the eager taxmen in the lifts ready to hinder your climb to power and beware of too much stress resulting in high blood pressure. **Definitely not for the faint hearted entrepreneur.**

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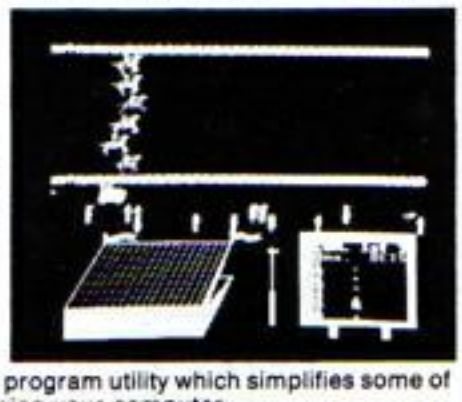
(All programs require Series 1.OS)



Also available:

ELECTRON-AID. An extremely useful 2 program utility which simplifies some of the more difficult aspects of programming your computer.

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Those 'Shady Characters' you didn't see!

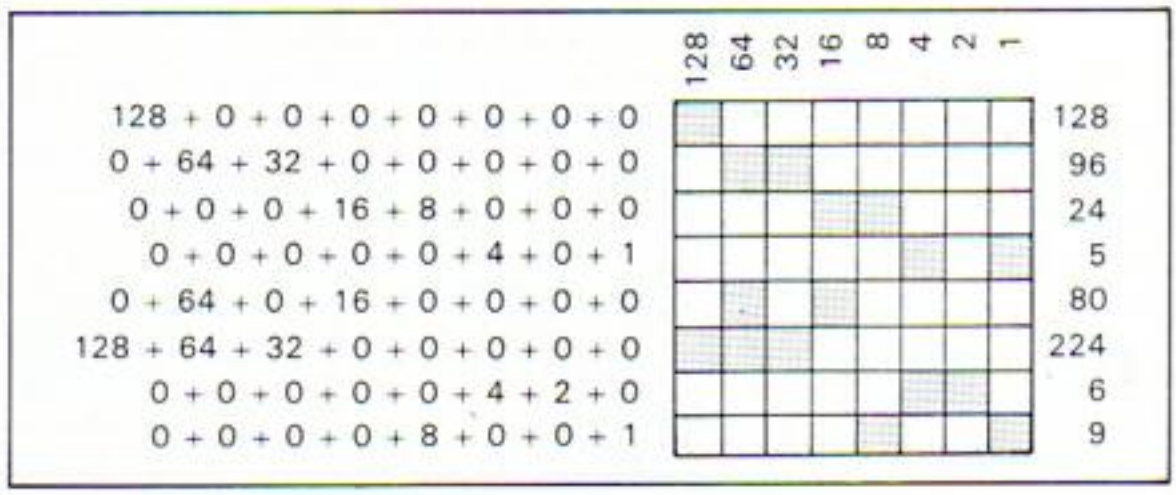
RED faces bloomed at *Electron User* when we saw what we'd done with Peter Grey's Shady Characters article in the May issue.

Actually it was what we hadn't done that caused the embarrassment. You might have noticed that Figure I and Figure II were fairly cryptic.

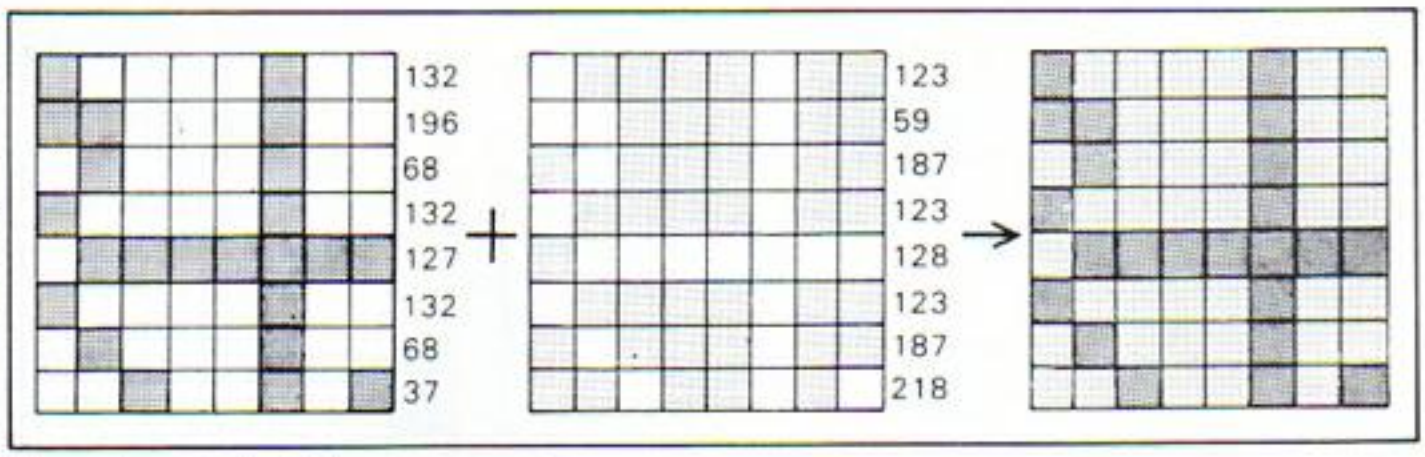
The reason was we hadn't filled in the 8 by 8 character grids to show you how the characters were made. We did mean to, honest!

At least we left in the numbers by the side of the grids so the more mathematical of you could figure out what should have been there.

Anyway our apologies to all of you who hurt your brains trying to figure out our figures. Sorry!



How Figure I should have appeared



How Figure II should have appeared

ADVERTISERS INDEX

Micro Messages

The phone's up to monkey tricks!

HELP! I like to do the characters in Casting Agency but even after reading the November article, I am still having trouble with the characters in the April magazine.

The monkey and the telephone come out in bits and not in line. Please help. – **David Matthiesen (aged 10), Hythe, Hants.**

● The following two programs should clear up your problem. Remember that you should type in all the VDU23s beforehand or else your Electron won't know what's happening.

Monkey:

```
10 MODE 1
20 VDU 230,231
   ,10,8,8,8
   ,232,233,234
   ,10,8,8,8
   ,235,236,237
   ,10
```

Phone:

```
10 MODE 1
20 VDU 230,231
   ,232,233,10
   ,8,8,8,8,234
   ,235,236,237
```

Games for joystick

FOLLOWING the highly successful launch of the First Byte Electron joystick Interface at the user show in London, we have received many new games from software houses which we have tested to ensure they work with our interface.

So here is the list of all games known to work with the First Byte Interface:

***Program Power:** Killer Gorilla, Moonraider, Positron, Croaker, Swoop, Bandits at 3 O'Clock, Escape from Moonbase Alpha, Cybertron Mission.*

***A&F:** Cylon Attack, Kamakaze, Chuckie Egg.*

***Romik:** Alien Break In, Atom Smasher, Birds of Prey.*

***Bug-Byte:** Galaxy Wars, City Defence.*

***Acornsoft:** Monsters.*

***Dynabyte:** Pool.*

***Postern:** Pengwyn.*

***Alligator:** Lunar Rescue, Bugblaster, Blagger.*

***Visions:** Snooker, Daredevil Dennis.*

***Optima:** Bed Bugs.*

Other games do work and we can provide a factsheet on how to add any new games to the games menu program provided free with the interface.

Interface owners can get details by sending a SAE to us. We will also keep owners updated via Electron User as the response from advertising in your magazine has proved how popular a magazine it is.

Finally, we have modified the design so that the rapid fire mode of Quickshot II will work on our interface.

All future production runs will incorporate this modification, but if anyone with an early model of the interface requires this modification, then they can return it to us with £1 to cover post and packing and we will be pleased to do the necessary. – **Ray Threadgould, FBC Systems, Derby.**

● Many thanks for the list. We've had any number of enquiries about what games will and will not work with what joystick interface. Hopefully the manufacturers of the other interfaces will keep us informed.

Certainly Signpoint, manufacturers of the Joyport, have told us that they seem to be extending the range of games every day.

Disabling Break

CAN you help out with an Electron problem?

The Break key is the only complaint I have with this excellent machine. When copying or using the cursor keys, accidents can happen and Break is pressed with great anxiety to follow.

*The normal *key 10 disable command does work on a home copied/listed program, but not on a proprietary purchase tape, such as Acornsoft.*

The key command only simulates OLD/List and of course loses the game score.

I have a two year old active son who thinks the Break key is great fun, especially when my older boys are concentrating on a good game.

Can you suggest a practical method of disabling the Break key, to be used as a separate entry before loading any tape. No suggestions for the two-year-old please, they have already been tried!

As an interim solution, the small hinged section of Lego – the roof of a Shell petrol tanker – using double sided tape, can be positioned over the Break key to prevent the majority of accidents, and of course, can be pivoted up to actually use it when required.

Perhaps you could let other people know for me.

One warning – double sided tape is not strong enough for a two-year-old!

Thanks for a good magazine. – **S.P. Taylor, Marlborough, Wilts.**

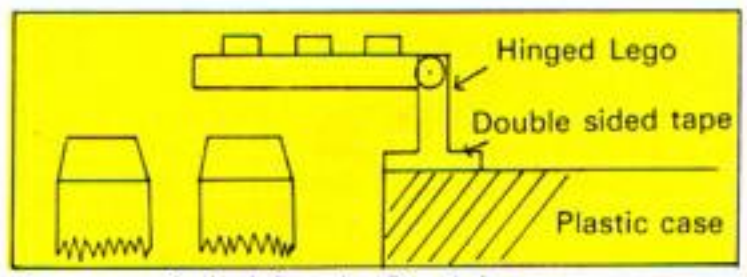
● The problem is that the Break key is directly linked to the 6502 chip at the heart of the Electron, and there's no way of disabling it with software. Having said that, we have little doubt our readers will come up with something.

Spaces problem

I BUY your magazine every month and find it good value and informative. However I feel that there are one or two points which could be improved upon, particularly with regard to program listings.

Some programs, such as the Parky's Peril game published in your March issue, have strings of spaces in them.

Because the spaces



One way of disabling the Break key

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Now's here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So tear yourself away from your Electron keyboard and drop us a line.

The address is:
Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport
SK7 5NY.

Micro Messages

From Page 61

are not distinct characters, it is not always possible to tell how many there are if there are several together.

In this case, this prevented the program from working properly because these strings were then "folded" into the shape of the maze by the insertion of backspace and carriage return characters.

It would seem to me to be preferable to say, for example (three spaces), explicitly rather than leave the user to guess.

Another point of doubt arises because of the confusion between "8" and "B" in hexadecimal numbers. The symbols you use for these are too alike, and confusion can arise. – **Brian Matthews Sheffield.**

● Teeth Gnashing Time at the *Electron User*. We thought we'd tamed this beastie. Point taken and we'll be looking at listings to avoid this in future.

It's not all that hard to sort out but we can see how frustrating it could be. As it is we're asking anyone who submits programs to us in future to use SPC or STRING$ to produce the spaces. This will make everyone's life easier.

Hibernating beast

I BOUGHT an Electron from Vector Marketing on December 10 1983 and after about a fortnight of very intermittent use, the line of keys 7/U/J/M ceased to work.

Because of their Christmas break I couldn't contact Acorn until early January 1984. They sent me a label to return the machine.

I sent it on January 7, it came back on February 14 and I was unable to get at it for a couple of days.

When I did, after 10 minutes use it would print only "Zzzzzzz . . ." and none of the control keys worked. Winter hibernation?

I contacted Acorn again requesting refund or replacement.

Again I was directed to return it to Retail Control Systems – which I did on March 3 as soon as Acorn sent the label.

I now sit reading your magazines hoping to become an Electron USER instead of only an owner!

Fourteen days use out of 102 days ownership isn't typical I hope, despite your report of up to 25 per cent failure rate!

Anything you can do to help? – **J. Williamson, Stanley, Co. Durham.**

P.S. Love your magazine! Wish I could put it to use!

● There's not much we can do to help except air your grievances. Certainly your case does seem untypical. Hope you join our band of Electron users soon.

SAVING THE SITUATION

I READ with interest the letter "Problems of saving" in the April issue of Electron User.

Before purchasing my Electron I took my cassette recorder to the shop to make sure it was compatible, a Din lead was fitted and the exact setting to load a program was determined for me.

Arriving home with my Electron, I found to my horror I was unable to save programs with the Din lead.

Returning to the shop, I was told they only ever had problems loading not saving programs.

My Din lead was exchanged for a split mic, ext L.S. remote lead, of which three new ones had to be tried before one was found to work. My advice to potential computer buyers is always throughly check your cassette recorder and lead.

If a new cassette recorder is found to be needed, shop around.

A Bush cassette in the computer shop was selling for £34.95 but the identical model was selling for £19.95 in the local radio shop.

Why should the computer shop be so dear? – **M Senior, Rotherham.**

● Thanks for your advice. Saving on cassette seems to be a major problem for Electron users. Perhaps owners who have a cassette recorder that works perfectly with the Electron could write in and tell us about it so we could compile a list.

IN addition to the suggestions made in reply to Mr G. Dean in the April issue of Electron User may I offer the following.

The problem may be an impedance mismatch, which in my case was overcome by inserting a 4.7kohm resistor in series with the centre lead of the mic cable.

If an $\frac{1}{8}$ watt resistor is used, the small physical size will enable it to be wired inside the jack which plugs into the recorder.

This operation costs only a few pence and is worth trying before assuming the recorder is incompatible with the Electron. – **P. Hodge, Leeds.**

FURTHER to Mr Dean's letter in the April issue of Electron User about having problems saving programs on the Electron, I was wondering if he and others have been sold cassette recorders that are not compatible.

When I bought my Electron, I was assured the cassette recorder I bought with it was compatible, and having had this changed twice and spoken to Acorn about the problem, I have finally settled on the BBC data recorder which works perfectly.

May I suggest that your readers who are just loading programs with the cassette recorder check that they can save programs as well, especially if they were sold the cassette recorder with the Electron as I was. – **G. Nicholls, Padgate, Warrington.**

SPECIAL OFFER!
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ACORN ELECTRON

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INVADERS £7.95
48 marching invaders drop bombs that slowly erode your defences, and two types of spaceship (normal and double speed) fly over releasing large bombs that penetrate through your defences. Increasing difficulty, hi-score, rankings, superb graphics and sound.

WORLD GEOGRAPHY £7.95
This program covers 166 countries which are divided into 8 categories of difficulty. Each country is pinpointed on an accurate hi-resolution screen map of the world, and the user is asked the capital and/or population. At the end of the test, the percentage of correct answers is given, so that the student can easily monitor his increasing geographical knowledge.

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Probably the best fruit machine implementation on the market. This program has it all . . . HOLD, NUDGE, GAMBLE, spinning reels, realistic fruits and sound effects, multiple winning lines. This is THE fruit machine program to buy.

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This fascinating program enables the user to "view the stars" from any point on the Earth's surface, on any date and at any time. A total of 455 stars in 50 constellations may be viewed, and the "telescope" may be moved up, down, left or right, zoomed in or zoomed out. The stars can be displayed by magnitude or constellation.

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